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ABSTRACT

The paper is one of a series dealing with different aspects of the fund-raising campaign, which began in mid-1971, for the establishment throughout Kenya of a large number of institutes of technology on a self-help basis. By March 1973, 17 such institutes had been proposed. In the absence of coordination each institute's planning committee is trying to draw up its own plan for curriculum, syllabus, enrollment, etc. It is an aim of this paper to bring together information which will be useful to this task and, it is hoped, will contribute to the public debate about the role that these institutes might play in Kenya's technical and vocational training system. The paper concentrates, therefore, on such fairly narrow, economic questions as sources of staff and students, employment prospects, and cost and financing. It starts with an analysis of the existing system of training and of plans for its expansion, based partly on a survey carried out by the Ministry of Finance and Economic Planning in 1971 and on a followup to that survey in 1972. The plans of the proposed harambee institutes are then reviewed and, in conclusion, some observations about their prospects are made. (Author/NH)

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TECHNICAL AND VOCATIONAL TRAINING IN KENYA AND THE HARAMBEE INSTITUTES OF TECHNOLOGY

by

E.M. Godfrey

DISCUSSION PAPER No. 169

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ABSTRACT

This paper is one of a series dealing with different aspects of the fund-raising campaign, which began in mid-1971, for the establishment throughout Kenya of a large number of institutes of technology on a self-help basis. By March 1973 such institutes had been proposed for Kiambu, Kirinyaga, Murang'a, Nyeri, Embu, Meru, Yatta, Mombasa, Nakuru, Kericho, Kihancha, Kisii, Kisumu, Kaimosi, Kakamega, Sang'alo and Kajiado. In the absence of coordination each institute's planning committee is trying to draw up its own plan for curriculum, syllabus, enrolment etc. It is an aim of this paper to bring together information which will be useful to this task and, it is hoped, to contribute to the public debate about the role that these institutes might play in Kenya's technical and vocational training system. We concentrate, therefore, on such fairly narrow, economic questions as sources of staff and students, employment prospects and cost and financing. We start with an analysis of the existing system of training and of plans for its expansion, based partly on a survey carried out by the Ministry of Finance and Economic Planning in 1971 and on our follow-up to that survey in 1972. The plans of the proposed harambee institutes are then reviewed and, in conclusion, some observations about their prospects are made on the basis of a comparison of the first two sections.

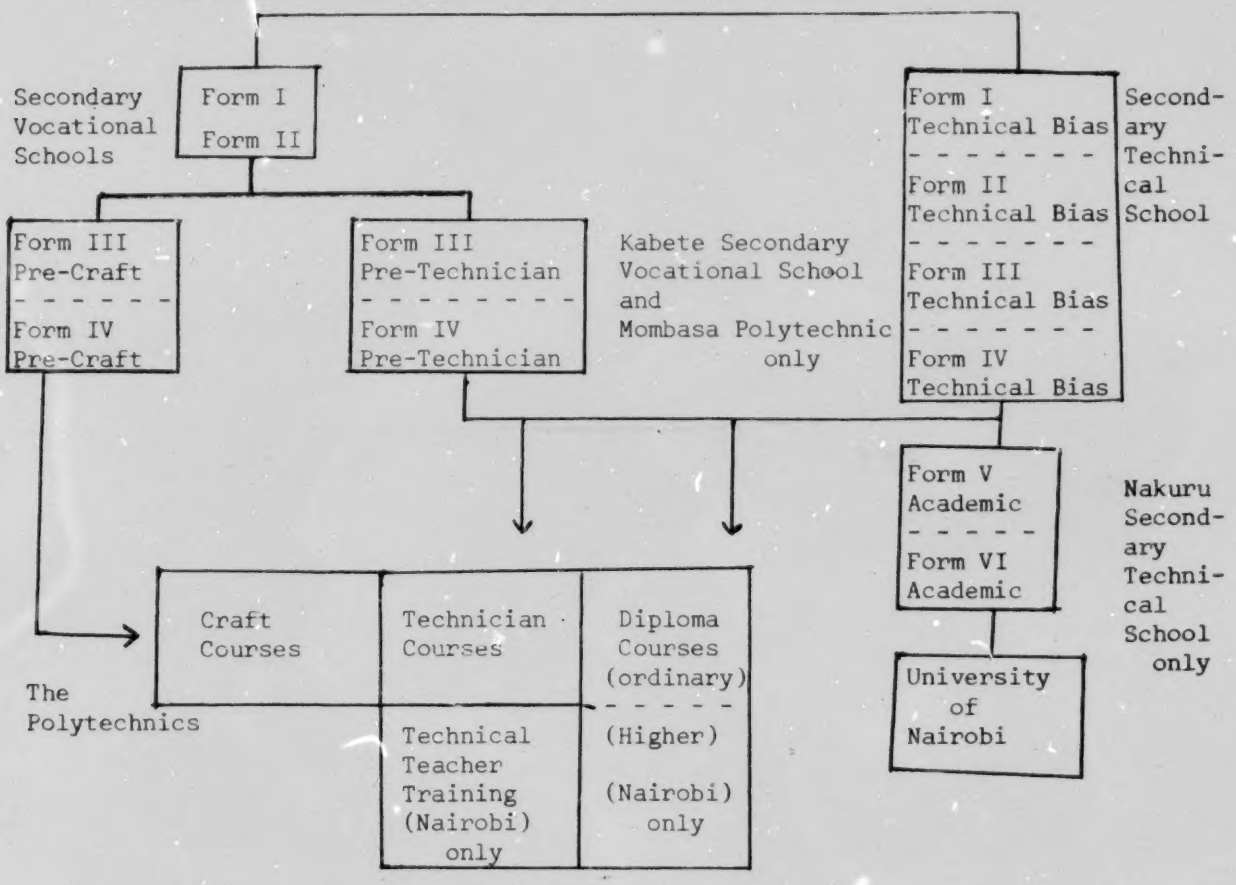
INTRODUCTION

This paper is one of a series dealing with different aspects of the fund-raising campaign, which began in mid-1971, for the establishment throughout Kenya of a large number of institutes of technology on a self-help basis. By March 1973 such institutes had been proposed for Kiambu, Kirinyaga, Murang'a, Nyeri, Embu, Meru, Yatta, Mombasa, Nakuru, Kericho, Kiharncha, Kisii, Kisumu, Kaimosi, Kakamega, Sang'alo and Kajiado. In the absence of coordination each institute's planning committee is trying to draw up its own plan for curriculum, syllabus, enrolment etc. It is an aim of this paper to bring together information which will be useful to this task and, it is hoped, to contribute to the public debate about the role that these institutes might play in Kenya's technical and vocational training system. We concentrate, therefore, on such fairly narrow, economic questions as sources of staff and students, employment prospects and cost and financing. We start with an analysis of the existing system of training and of plans for its expansion, based partly on a survey carried out by the Ministry of Finance and Economic Planning in 1971 and on our follow-up to that survey in 1972. The plans of the proposed harambee institutes are then reviewed and, in conclusion, some observations about their prospects are made on the basis of a comparison of the first two sections. Readers in a hurry could refer directly to the discussion of prospects in section C (p. 38).

A. THE EXISTING SYSTEM OF TECHNICAL EDUCATION AND TRAINING

The standard diagram to describe the system of technical education and training in Kenya, first devised by King[1] and later reproduced in several official reports, is as follows:

Diagram: Technical Education and Training in Kenya.



This diagram is accurate as far as it goes[2], but it describes only a limited part of the system - the part that is under the auspices of the Ministry of Education. The secondary vocational schools are eight in number and situated at Kabete, Thika, Kisumu, Eldoret, Kaiboi, Mawego, Meru and Machakos; the four secondary technical schools are at Mombasa, Nairobi, Nakuru and Sigalagala. Neither vocational nor technical schools aim at turning out finished craftsmen and technicians but rather at preparing their pupils for further training.

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1. C.D. King, Development of Secondary Vocational and Technical Schools and Training of Technical Teachers, (mimeo), Ministry of Education, 1970.

2. Although changes in the syllabus of the secondary vocational schools may soon make it out of date.

With the upgrading of Mombasa Technical Institute there are now two polytechnics, while the University of Nairobi offers technologist-level courses in engineering (catering for all East African countries) and other technical subjects.

However, there is a great deal of technical and vocational education and training going on in Kenya which falls outside the responsibility of the Ministry of Education. The Ministry of Labour, for instance, is responsible for all industrial training below the level of the polytechnics and the university. It is in the process of introducing a new industrial levy scheme (under the 1970 Industrial Training Act), but this is at present confined to the building, sugar and motor vehicle industries and will not be fully operative for several years[3]. Its most important training institution is the National Industrial and Vocational Training Centre (NIVTC) in Nairobi which undertakes craft training of apprentices sponsored by employers. Another NIVTC is being set up in Kisumu, and a third one for Mombasa is planned.

In addition there is Egerton College in Njoro, offering three-year diploma courses in agriculture, as well as Embu Institute of Agriculture and the Animal Health and Industry Training Institute at Kabete (training technical assistants) and numerous farmer training centres under the control of the Ministry of Agriculture. The Ministry of Cooperatives and Social Services is in charge of the village polytechnic programme, and the Ministries of Health, Commerce and Industry, Information and Broadcasting, Natural Resources and Works, the Directorate of Personnel, East African Railways, Harbours, Airways, Post and Telecommunications, religious and charitable organisations and private firms, formal and informal,[4] all have their own training schemes. Finally there are the private "colleges" offering mainly secretarial courses.

As far as is known, no attempt has so far been made to analyse the provision of technical/vocational education and training in its entirety, largely because of lack of data about the smaller-scale institutions and activities. However, in 1971 the Ministry of Finance and Economic Planning took some steps to rectify this situation by carrying out a survey of training institutions. The survey did not attempt to cover all training activities. Police and army training and, on the whole, institutions

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3. For details and discussion of the new national industrial training scheme see Ministry of Labour: The National Industrial Training Scheme for the Training of Craft Apprentices, 1972. and A.P.M. Grima: Basic Requirements for the Development of the National Apprenticeship Training Scheme in Kenya. NIVT Project, June 1972

4. For a fascinating description of the training offered by the informal sector in Kenya see Kenneth King: Skill Acquisition in the Informal Sector of an African Economy . the Kenya Case. (mimeo) Centre of African Studies, Edinburgh, January 1973.

offering short courses of less than a few months, (such as the Government Training Institute, Maseno, the Kenya Institute of Management and the Management Advisory and Training Centre) were excluded. Secretarial colleges, both government and private, were the subject of a separate enquiry, and training by private firms was given only patchy coverage. The whole area of trade-testing and on-the-job training, in fact, does not fit neatly into a survey of this kind and was found to require separate treatment.

Using the Ministry's survey (hereafter MFEP survey) as a base, we were able during 1972 to obtain further information[5] from a wide range of training institutions on enrolment in each of their courses in 1970, 1971 and 1972, their best guess as to likely enrolment in 1977 and their staffing position. Since our interest is primarily in the fields in which the proposed harambee institutes are intending to operate we further excluded from this follow-up survey legal, medical and academic teacher training, training which takes place in schools and at the university, on-the-job and short-course farmer training and village polytechnics. This leaves us with data on the following rather mixed bag of institutions:

Ministry of Education: Kenya Polytechnic
Mombasa Polytechnic

Ministry of Agriculture: Egerton College
Embu Institute of Agriculture
Animal Health and Industry Training Institute
Thomsons Falls Large Scale Farmers Training Centre
Eldoret Large Scale Farmers Training Centre
Naivasha Dairy Training School
Water Development Training Scheme

Directorate of Personnel: Kenya Institute of Administration
Kenya Government Secretarial Training Centre
Government Secretarial College, Mombasa

Ministry of Commerce and Industry: Kenya Industrial Training Institute

Ministry of Information and Broadcasting: Kenya Institute of Mass Communications

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5. Initially by questionnaire and subsequently by personal interview where necessary.

Ministry of Cooperatives and Social Services: Cooperative College

Ministry of Natural Resources: Forest Training School

Ministry of Labour: National Youth Service Vocational Training Unit, Mombasa

East African Railways: Railway Training School

Miscellaneous: Institute of Tailoring and Cutting.
Christian Industrial Training Centre, Nairobi
Christian Industrial Training Centre, Mombasa
Starehe Boys' Centre, Technical Division
YMCA Crafts Training Centre
Limuru Boys' Centre
Strathmore College - School of Accountancy
YWCA Vocational Training Centre, Mombasa
Six private secretarial colleges recommended by the Federation of Kenya Employers.

From these and other data we have extracted information about actual and planned enrolment, staff, intake of students, output of trainees and cost and financing, which are presented and discussed in the following paragraphs.

1. Enrolment - the situation in 1972

The enrolment in 1972 in each of the institutions listed above (excluding courses of less than three months) is shown at Appendix 1. There is insufficient space for comments on each individual institution, but one point is worth noting here. The number of students following full-time courses at Kenya Polytechnic is relatively small - 634 or 19 per cent of total enrolment[6] - and most of these are in the business studies, catering and technical teacher training departments. At Mombasa Polytechnic the proportion is higher - 51 per cent - but this is likely to fall as it takes on full polytechnic status. Since the NIVTC mainly offers part-time training to those already employed, this means that a very high proportion of formal training of a technical/industrial type at skilled level or above is given on a part-time basis to students already in jobs and sponsored by their employers.

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6. Of the remainder, 34 per cent are taking day-release courses, 33 per cent 'mixed' day-release/full-time courses, 12 per cent evening courses and 2 per cent sandwich courses.

The enrolment figures for the individual institutions are aggregated in Table 1, with specialisations grouped under the four broad headings, agricultural, technical/industrial, business/administrative and other.

The table is dominated by Kenya Polytechnic, whose enrolment accounts for 39 per cent of the total. To get a fuller picture we need to take account of activities not covered by our survey. Even from the limited information in the table, however, it can be seen that relatively few students are enrolled in courses of more than two years, which enables the system to be fairly responsive to changes in the pattern of manpower demand. Also the system is expanding steadily. From our follow-up survey we discovered that the annual average rate of increase in aggregate enrolment between 1970 and 1972 was about 8 per cent[7]. In general the lower the level of the training the faster the rate of expansion, but the following categories showed particularly fast rates of increase : semi-professional, civil engineering, catering and domestic science and education; skilled, other engineering, printing, design and handicrafts and agriculture; below skilled, mechanical engineering and design and handicrafts.

The most important institution not covered by the survey and relevant from our point of view is probably the NIVTC, Nairobi. During 1972 677 trainees attended the centre. The courses varied in length but averaged 7 weeks per trainee, giving a total of 4,590 man-weeks of training. The breakdown of NIVTC activities in 1972, with 1970 and 1971 included for comparative purposes, is given in Table 2.

The technical teacher training programme is run in conjunction with Kenya Polytechnic, in whose enrolment statistics these students have already been counted. The change in the role of NIVTC in recent years is readily apparent, with 77 per cent of its teaching in 1972 being devoted to apprentice-training compared with only 29 per cent two years earlier. This reflects official efforts to boost the registered - apprentice system, which has been of little importance in Kenya in the past, particularly at craft level. For example, Grima[8] points out that between May 1967 and December 1971 only 778 contracts were registered for technician and craft apprentices and

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7. The rate of increase slowed down in 1972 owing mainly to staffing problems. Between 1970 and 1971 it had been 11 per cent; between 1971 and 1972 it was only 5 per cent.

8. Grima. op. cit. p.9

TABLE 1: AGGREGATE ENROLMENT BY SPECIALISATION, QUALIFICATION AIMED AT AND YEAR OF S

	TECHNICAL / INDUSTRIAL									
	SCIENCE	ENGINEERING						AGRI-CULTURE	BUSINESS ADMIN	Cater Dom Sc
		Elect	Mech	Civil	Other	Printing	Design & Handcraft			
PROFESSIONAL										
Final year		17	8						13	
2 years left		10	6							
3 years left		11	11							
TOTAL		38	25						13	
SEMI-PROFESS.										
Final year	65	110	257	185			7	334	302	46
2 years left	79	123	166	158			21	400	313	57
3 years left	41	132	186	183				191	72	34
4 years left	15	125		1						27
TOTAL	200	490	609	527			28	925	687	164
SKILLED										
Final year		10	166	81	328	8	50	10	1508	30
2 years left		31	136	9	213	8		11	140	
3 years left		14		10	28	22			34	
4 years left		18		12	36	13				
5 or more						28				
TOTAL		73	302	112	605	79	50	21	1682	30
BELOW SKILLED										
Final year		40	113	328	35	19	255	234	3	
2 years left			34	111	91		10	25		
3 years left			32	76	39		8			
4 years left					50					
TOTAL		40	179	515	215	19	273	259	3	
OTHER										
Final year	56									
2 years left	46									
TOTAL	102									
ALL LEVELS										
Final year	121	177	544	594	363	27	312	578	1826	76
2 years left	125	164	342	278	304	8	31	436	453	57
3 years left	41	157	229	269	67	22	8	191	106	34
4 years left	15	143		13	86	13				27
5 or more						28				
TOTAL	302	641	1115	1154	820	98	351	1205	2385	194

Source: Follow-up Survey.

OLMENT BY SPECIALISATION, QUALIFICATION AIMED AT AND YEAR OF STUDY, 1972

INDUSTRIAL				AGRI-	BUSINESS	OTHER			ALL COURSES
R I N G		Printing	Design & Handcraft	CULTURE	ADMIN.	Catering Dom Sci	Educ.	Misc.	
vil.	Other								
					13				38
									16
									22
					13				76
85			7	334	302	46	95	35	1436
58			21	400	313	57	75	25	1417
83				191	72	34	76		915
1						27	50		218
27			28	925	687	164	296	60	3986
81	328	8	50	10	1508	30			2191
9	213	8		11	140				548
10	28	22			34				108
12	36	13							79
		28							28
12	605	79	50	21	1682	30			2954
28	35	19	255	234	3				1027
11	91		10	25					271
76	39		8						155
	50								50
15	215	19	273	259	3				1503
									56
									46
									102
94	363	27	312	578	1826	76	95	35	4748
78	304	8	31	436	453	57	75	25	2298
69	67	22	8	191	106	34	76		1200
13	86	13				27	50		347
		28							28
54	820	98	351	1205	2385	194	296	60	8621

TABLE 2: NIVTC, NAIROBI, ACTIVITIES, 1970-1972

	1970			1971			
	No. of Trainees	Average Weeks of Training	Man / weeks	No. of Trainees	Average Weeks of Training	Man / weeks	No. o Train
Technical Teachers							
Building	28	3	80	14	12	168	10
Electrical	17	7	121	16	14	228	42
Mechanical	39	8	312	22	18	387	20
Motor Vehicle Repair	7	1	7	-	-	-	11
Total	91	6	520	52	15	783	83
Apprentices							
Building	32	6	192	73	12	858	248
Electrical	-	-	-	8	9	72	64
Mechanical	8	23	184	31	13	395	30
Motor Vehicle Repair	24	5	128	24	6	148	74
Total	64	8	504	136	11	1473	416
Skill Improvement							
Building	96	2	222	81	3	213	-
Electrical	38	2	82	15	1	15	71
Mechanical	135	2	304	53	2	103	37
Motor Vehicle Repair	55	2	89	45	2	82	70
Total	324	2	697	194	2	413	178
All Courses							
Building	156	3	494	168	7	1239	258
Electrical	55	4	203	39	8	315	177
Mechanical	182	4	800	106	8	885	87
Motor Vehicle Repair	86	3	224	69	3	230	155
Total	479	4	1721	382	7	2669	677

Source: Directorate of Industrial Training.

BLE 2: NIVTC, NAIROBI, ACTIVITIES, 1970-1972

1970		1971			1972		
Average Weeks of Training	Man /weeks	No. of Trainees	Average Weeks of Training	Man /weeks	No. of Trainees	Average Weeks of Training	Man /weeks
3	80	14	12	168	10	13	130
7	121	16	14	228	42	8	336
8	312	22	18	387	20	13	260
1	7	-	-	-	11	6	66
6	520	52	15	783	83	10	792
6	192	73	12	858	248	8	1984
-	-	8	9	72	64	9	576
23	184	31	13	395	30	13	390
5	128	24	6	148	74	8	592
8	504	136	11	1473	416	9	3542
2	222	81	3	213	-	-	-
2	82	15	1	15	71	2	142
2	304	53	2	103	37	2	74
2	89	45	2	82	70	2	140
2	697	194	2	413	178	2	356
3	494	168	7	1239	258	8	2114
4	203	39	8	315	177	6	1054
4	800	106	8	885	87	7	624
3	224	69	3	230	155	5	798
4	1721	382	7	2669	677	7	4590

ng.

49 for indentured learners. Moreover 630 of the 778 apprentices were accounted for by three concerns, East African Railways (with 350) East African Airways (110) and East African Power and Lighting (170). The majority of EAR's and EAA's apprentices would be non-Kenyans and the majority of EAA's and EAPL's were technician - apprentices. The remaining 148 apprentices employed by concerns other than these three, mainly private firms and government departments in the Nairobi area, represent an annual registration rate of about 32. Incomparably more important so far has been the "unregistered" training imparted to many thousands in industry's own training schools or purely on the job. For instance, 5,500 people, very few of them formally apprenticed or with any contact with a training institution, presented themselves for trade tests during 1971 at grades I, II and III, of whom 3,070 passed.[9] Moreover, this undoubtedly excludes a large number of 'learners' in the informal sector who do not take trade tests.

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2 Enrolment - Plans for Expansion:

The principals or directors of the institutions covered by Table 1 were asked, in our follow-up survey, for their 'best guess' as to likely enrolment in each of their courses in 1977. The aggregation of their answers is shown in Table 3.[10]

An overall rate of expansion in enrolment of 7 per cent p.a. is envisaged, slightly lower than the rate achieved in 1970-1972. However, this understates the likely increase in training provision since during this period the two Polytechnics will be off-loading their skilled-and-below courses on to NIVTC in order to concentrate on higher-level training. This is reflected in the pattern of expansion in the table, with semi-professional and professional enrolment showing the fastest rates of increase.[11] Moreover, these are the prospects as seen by the individuals most closely concerned in July 1972. They were guessing without knowledge of other institutions' plans, trends in government policy etc. In some cases this may have led to underestimation. The projections for Mombasa Polytechnic, for instance, seem pessimistic in relation to government plans for its development.

15

The expanding role of NIVTC is illustrated in Table 4:

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9. A detailed breakdown of trade tests completed is shown at appendix 2.

10. Estimated enrolment in new projects such as the Technical Teachers Training College, the Hotel Training Centre and Bukura Institute of Agriculture is also included.

11. Particularly high rates of increase are projected for the following categories: professional, mechanical and civil engineering and business administration; semi-professional, education (i.e. technical teacher training); skilled,

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about 32. Incomparably more important so far has been the "unregistered" training imparted to many thousands in industry's own training schools or purely on the job. For instance, 5,500 people, very few of them formally apprenticed or with any contact with a training institution, presented themselves for trade tests during 1971 at grades I, II and III, of whom 3,070 passed.[9] Moreover, this undoubtedly excludes a large number of 'learners' in the informal sector who do not take trade tests.

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TABLE 3: AGGREGATE ENROLMENT BY SPECIALISATION, QUALIFICATION AIMED AT & YEAR OF ST

	SCIENCE	TECHNICAL / INDUSTRIAL ENGINEERING				Printing	Design & Handicraft	AGRI-CULTURE	BUSINESS ADMIN	Cat Dom
		Elect	Mech	Civil	Other					
PROFESSIONAL										
Final year		15	15	10					45	
2 years left		17	18	10						
3 years left		20	20	10						
4 years left										
TOTAL		52	53	30					45	
SEMI-PROFESS										
Final year	123	233	293	354	24		24	593	580	
2 years left	133	268	288	329	24		28	559	474	
3 years left	85	175	233	215				191	150	
4 years left		80		5						
TOTAL	341	756	814	903	48		52	1343	1207	1
SKILLED										
Final year		10	165	70	10	42	90	18	2245	
2 years left			140	22		43		20	278	
3 years left				16	30	52			84	
4 years left				15		50				
5 or more						52				
TOTAL		10	305	123	40	239	90	38	2607	
BELOW SKILLED										
Final year		40	128	430	40	23	610	314		
2 years left			30	182	40		15	24		
3 years left			30	78	20		12			
4 years left				72	20					
TOTAL		40	188	762	120	23	637	338		
OTHER										
Final year	45									
2 years left	50									
TOTAL	95									
ALL LEVELS										
Final year	168	298	601	864	74	65	724	925	2873	
2 years left	183	285	476	543	64	43	43	603	752	
3 years left	85	195	283	319	50	52	12	191	234	
4 years left		80		92	20	50				
5 or more						52				
TOTAL	436	858	1360	1818	208	262	779	1719	3859	

Source: Follow-up Survey.

ENT BY SPECIALISATION, QUALIFICATION AIMED AT & YEAR OF STUDY, 1977

USTRIAL N G Other	Printing	Design & Handicraft	AGRI-CULTURE	BUSINESS ADMIN	OTHER Catering Dom Sci	Educ	Misd	ALL COURSES
				45				85
								45
								50
				45				180
24		24	593	583	55	165	32	2479
24		28	559	474	32	146	35	2316
			191	150	36	147		1232
					40	100		225
48		52	1343	1207	163	558	67	6252
10	42	90	18	2245	60			2710
	43		20	278				503
30	52			84				182
	50							65
	52							52
40	239	90	38	2607	60			3512
40	23	610	314					1585
40		15	24					291
20		12						140
20								92
120	23	637	338					2108
								45
								50
								95
74	65	724	925	2873	115	165	32	6904
64	43	43	603	752	32	146	35	3205
50	52	12	191	234	36	147		1604
20	50				40	100		382
	52							52
208	262	779	1719	3859	223	558	67	12147

TABLE 4: PROPOSED ACTIVITIES OF NIVTC NAIROBI AND KISUMU ITC, 1975

	NAIROBI			KISUMU			TOTAL		
	No of Trainees	Average Weeks of Training	Man/weeks	No of Trainees	Average Weeks of Training	Man/weeks	No of Trainees	Average Weeks of Training	Man/weeks
Technical Teachers									
Building	20	6	120				20	6	120
Electrical	20	6	120				20	6	120
Mechanical	20	6	120				20	6	120
Motor Vehicle Repair	20	6	120				20	6	120
Others	20	6	120				20	6	120
Total	100	6	600				100	6	600
Apprentices									
Building	160	36	5,760	30	36	1,080	190	36	6,840
Electrical	20	43	864	20	36	720	40	40	1,584
Mechanical	60	36	2,160	30	36	1,080	90	36	3,240
Motor Vehicle Repair	50	36	1,800	20	36	720	70	36	2,520
Others	40	36	1,440	20	36	720	60	36	2,160
Total	330	36	12,024	120	36	4,320	450	36	16,344
Skill Improvement									
Building	20	6	120	20	12	240	40	9	360
Electrical	8	6	48	10	12	120	18	9	168
Mechanical	30	6	180	10	12	120	40	8	300
Motor Vehicle Repair	30	6	180	10	12	120	40	8	300
Others	14	6	84	10	12	120	24	9	204
Total	102	6	612	60	12	720	162	8	1,332
All Courses									
Building	200	30	6,000	50	26	1,320	250	29	7,320
Electrical	48	22	1,032	30	28	840	78	24	1,872
Mechanical	110	22	2,460	40	30	1,200	150	24	3,660
Motor Vehicle Repair	100	21	2,100	30	28	840	130	23	2,940
Others	74	22	1,644	30	28	840	104	24	2,484
TOTAL	532	25	13,236	180	28	5,040	712	26	18,276

Source: Directorate of Industrial Training

As can be seen, total man-weeks of training are expected to reach 13,236 at the Nairobi centre by 1975, which represents an annual average rate of increase over 1972 of 42 per cent. Apprentice training alone in Nairobi is expected to increase at a rate of 50 per cent per annum. Moreover, a new centre is due to open in Kisumu during 1973, concentrating on skill-improvement courses at first but, as shown in the table, building up a sizeable apprentice-training programme by 1975, bringing the total rate of increase for such training to 66 per cent per annum. By then, also, a third centre in Mombasa, with an annual throughput of some four hundred trainees, is likely to be coming into operation. All this reflects not only the taking over of lower-level courses from the Polytechnics but also a widening in the coverage of the National Industrial Training Scheme, which is intended eventually to cover all industries.

3. Staff

In our follow-up survey we were able to obtain information about teaching staff in 1970, 1971 and 1972 from virtually all the institutions surveyed [12]. Lack of detail limits us to the rather crude classification shown in Table 5.

This does enable us, however, to assess the progress of Kenyanisation at different levels and in different broad subject-headings. In general, after slowing down in 1971, the pace seems to have increased in 1972, by which time 53 per cent of the teaching staff of these institutions were Kenyan. The difficulty of recruiting local staff as teachers in technical / industrial subjects at a semi-professional level is shown by the fact that only 35 per cent Kenyanisation had been achieved in that category.[13] In 1971, when 48 per cent of the staff of the training institutions covered in Table 4 were citizens, the comparable percentages for secondary schools and teachers' colleges were 59 and 57 respectively.

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12. The exceptions were AHITI (Agriculture Semi-Professional) and KIA (Business/Administration Semi-Professional) whose Kenyanisation rates in 1972 were 57 per cent (of 28) and 76 per cent (of 54) respectively.

13. The MFEP survey went into more detail and achieved a much lower response rate. Of the 261 teachers employed in the two Polytechnics, Egerton College, Embu Institute, Strathmore College, Limuru Boys' Centre, the two CITCs, Starehe Technical Division, NIVTC and YMCA CTC in 1970 41 per cent were citizens. Citizens formed a slightly smaller proportion of those with vocational qualifications above the skilled level (32 per cent) than of those with university degrees (35 per cent). Not surprisingly at lower levels of qualification the proportion of citizens was much higher. The numbers were too small for us to make much of the individual categories but it may be noted that the least Kenyanised specialisations were education, electrical engineering, science, arts (surprisingly) and business and administration.

TABLE 5: TEACHING STAFF BY CITIZENSHIP AND BY TYPE AND LEVEL OF INSTITUTION, 1970, 1971

TYPE OF COURSES:	TECHNICAL / INDUSTRIAL			AGRICULTURAL			BUSINESS/ADMIN.			OTHER	
	1970	1971	1972	1970	1971	1972	1970	1971	1972	1970	1971
SEMI-PROFESSIONAL											
CITIZENS	37	37	48	48	56	64		2	2	1	1
NON-CITIZENS	85	91	91	34	41	40	4	3	3	8	6
TOTAL	122	128	139	82	97	104	4	5	5	9	7
SKILLED											
CITIZENS	38	44	53				29	33	45		
NON-CITIZENS	48	57	58				29	34	36		
TOTAL	86	101	111				58	67	81		
BELOW SKILLED											
CITIZENS	58	59	62	13	20	27					
NON-CITIZENS	20	22	19	12	17	12		2	2		
TOTAL	78	81	81	25	37	39		2	2		
ALL LEVELS											
CITIZENS	133	140	163	61	76	91	29	35	47	1	1
NON-CITIZENS	153	170	168	46	58	52	33	39	41	8	6
TOTAL	286	310	331	107	134	143	62	74	88	9	7

Source: Follow-up Survey.

FF BY CITIZENSHIP AND BY TYPE AND LEVEL OF INSTITUTION, 1970, 1971, & 1972.

INDUSTRIAL	AGRICULTURAL			BUSINESS/ADMIN.			OTHER			ALL LEVEL		
1972	1970	1971	1972	1970	1971	1972	1970	1971	1972	1970	1971	1972
48	48	56	64		2	2	1	1	1	86	96	115
91	34	41	40	4	3	3	8	6	5	131	141	139
139	82	97	104	4	5	5	9	7	6	217	237	254
53				29	33	45				67	77	98
58				29	34	36				77	91	94
111				58	67	81				144	168	192
62	13	20	27							71	79	89
19	12	17	12		2	2				32	41	33
81	25	37	39		2	2				103	120	122
163	61	76	91	29	35	47	1	1	1	224	252	302
168	46	58	52	33	39	41	8	6	5	240	273	266
331	107	134	143	62	74	88	9	7	6	464	525	568

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A few of the institutions gave information to the MFEP survey about the ages of their staff, which has enabled us to put together Table 6, showing staff by age - group, citizenship and sex:

TABLE 6: STAFF BY AGE-GROUP, CITIZENSHIP AND SEX, 1972

AGE GROUP:	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	ALL AGES
CITIZENS											
Male	6	26	13	8	1						54
Female	1	-	2	1	-						4
Total	7	26	15	9	1						58
NON-CITIZENS											
Male	5	15	17	23	20	10	12	8	4	1	115
Female	3	4	2	-	-	-	-	-	-	-	12
Total	8	19	19	23	23	10	12	8	4	1	127
TOTAL											
Male	11	41	30	31	21	10	12	8	4	1	169
Female	4	4	4	1	3	-	-	-	-	-	16
Total	15	45	34	32	24	10	12	8	4	1	185

Source: Based on returns from the two Polytechnics, Strathmore, CITC Mombasa, Starehe Technical Division and YMCA CTC.

The pattern shown is not unexpected. As well as being fewer than non-citizens citizens are also younger, with the largest numbers in the 25 - 29 age-group as against the 35 - 44 age-groups in the case on non-citizens. In both cases the ratio of female to male staff is very low.

Kenya's technical training institutions are faced with a shortage not just of local staff but of staff as a whole. As the current annual report of the Ministry of Education[14] notes, "a growing need for day-release courses in many subject areas manifested itself [at Mombasa Polytechnic] but the difficulty in recruiting qualified lecturers impeded any extension in the number of courses offered." Indeed in July 1972 Mombasa Polytechnic had only 35 teachers (as against an establishment of 50) and a quarter of these were overseas volunteers. As a result all technician-level courses had to be postponed until 1973. Moreover, at Kenya Polytechnic, to quote again from the Ministry of Education[15], "recruitment of lecturers continued to be a major obstacle and recruitment efforts, both locally and overseas, were failing to meet current requirement, and curtailing the development programme." Nor is the problem confined to the two Polytechnics. The Kenya Institute of Mass Communications, for instance, which apart from the Principal is staffed entirely by non-citizens, was working at only half its established strength of ten teachers in July 1972 and shortage of staff was described as the major constraint on its expansion.

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14. Ministry of Education. Annual Report 1971. 1972. p.9.

Total	7	26	15	9	1						58
NON-CITIZENS											
Male	5	15	17	23	20	10	12	8	4	1	115
Female	3	4	2	-	3	-	-	-	-	-	12
Total	8	19	19	23	23	10	12	8	4	1	127
TOTAL											
Male	11	41	30	31	21	10	12	8	4	1	169
Female	4	4	4	1	3	-	-	-	-	-	16
Total	15	45	34	32	24	10	12	8	4	1	185

Source: Based on returns from the two Polytechnics, Strathmore, CITC Mombasa, Starehe Technical Division and YMCA CTC.

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14. Ministry of Education, Annual Report 1971, 1972. p.9.

15. Ibid. p.9.

4 Intake of Students

Table 7 shows 1972 intake[16] by entry requirement and qualification aimed at for the institutions covered by the follow-up survey. In the case of secondary school qualifications institutions did not on the whole distinguish between general and technical / vocational schools; the distinction was made by the author where it seemed appropriate on the grounds of the subject to be studied

TABLE 7: INTAKE OF STUDENTS BY ENTRY REQUIREMENT & QUALIFICATION AIMED AT, 1972

Qualification aimed at:	Profess.	Semi-Prof	Skilled	Below Skilled	Pre-Univ.	TOTAL
Entry Requirement:						
Vocational Qualification Semi-prof or above	35	138				173
Vocational Qualification Skilled		52	29			81
Vocational Qualification Below Skilled			130	50		180
Secondary School Form VI General			15			15
Secondary School Form IV General	13	1055	1472		46	2586
Tech/Voc		743	54			803
Secondary School Form III or below General			49	3		52
Tech/Voc			481			481
Primary School				605		605
No Formal Requirements		33	134	475		642
TOTAL	48	2027	2364	1133	46	5618

Source: Follow-up Survey.

Several points arise from this table. It is interesting to note that while the demand from these institutions for Form VI leavers is still small, Form IV is now a common prerequisite and some secondary education is virtually essential for entrants to all skilled-level courses. For courses at semi-professional level there is very little variation in entry standards between our broad groups of specialisations - Form IV is the standard requirement. For skilled-level courses, however, business and administration appear to demand higher educational qualifications than the other groups while agricultural and 'other' courses (particularly catering and domestic science) often require no formal, educational qualifications from their entrants.

16. Intake is derived from the enrolment figures, such that intake in 1972 is enrolment in the first year of a course in 1972.

According to Table 7 the institutions covered by the survey required (or, more properly, would have liked) an intake in 1972 of 803 students with secondary technical / vocational education to Form IV and 481 students with a similar education to Form III or below. In addition the NIVTC took in a hundred new apprentices (in the Form-III-or-below category) for training. Thus total requirements were for some 1294 secondary technical / vocational school-leavers from Form IV or below. This compares with an output from all forms of such schools in 1971 of 750. Many of these presumably did not make themselves available for further training. Which suggests that a considerable number of students were entering courses at a skilled and semi-professional level without first having met the 'requirement' of attendance at a secondary technical / vocational school.

Not that such attendance is a guarantee of quality. It is no secret that employers and training institutions are dissatisfied with the level of competence achieved by secondary technical / vocational school-leavers. Early in 1972 for example, a group of ninety-six sponsored first-year apprentices, all of whom had attended such schools, took preliminary proficiency tests in their own specialisations at the NIVTC. Even after an extended twelve-week training course 46 of the 96 failed the test. Only in electrical trades was there a hundred-per-cent pass rate (for 19 candidates); in mechanical trades only 4 out of 11, in automotive trades only 1 out of 28 passed. This may be partly attributable to poor selection procedure for trades other than electrical but mainly to insufficient time having been given at school to practical subjects and to inadequate facilities and materials. That employers are aware of these deficiencies is shown by their low response rate to the invitation from the Directorate of Industrial Training to make known their 1973 apprentice requirements.

From our enrolment projections of Table 3 we can derive projections of intake for 1977. These are shown in Appendix 3. Entry qualifications are assumed to remain unchanged - an assumption that may be unrealistic in the face of an expansion in the numbers of secondary - school - leavers. The projections suggest that the supply of competent candidates for technical training will still fall short of demand. The surveyed institutions alone will be requiring 1,067 entrants with secondary technical / vocational schooling, while the greatly expanded national industrial training system (see Table 4) will also be looking for such trainees. Projected enrolment in secondary technical and vocational schools in 1977 is 5,450, implying an output of only about 1,250, not all of whom will be available for further training of this kind.

5. Output - the Situation in 1972

Table 8 shows output in 1972 by intended occupation, level and sector for the institutions covered by the follow-up survey. It should be emphasised that these are not necessarily the occupations actually obtained by the trainees - rather the occupations for which the training was intended. Nor, since the 'output' figures merely represent enrolment in the final year of a course, are all those shown as output necessarily fully qualified in the sense of having passed their final examination.

Once again to get a fuller picture we ought to take into account output from activities not covered by the survey. Output from NIVTC is difficult to define since its training consists of short courses interspersed with on-the-job experience; 677 trainees took courses there during the year but cannot be said to have finished their training. The number who completed purely on-the-job training (if one can ever be said to have completed such training) is impossible to estimate accurately although some indication may perhaps be obtained from the list of those who passed trade tests of various grades. A detailed breakdown for 1972 is shown in Appendix 2, with comparable aggregates for 1970 and 1971. As can be seen there, a total of 2,967 candidates passed the tests in 1972, of whom 201 at grade I, 696 at grade II and 2,070 at grade III. Only a small proportion of these is likely to have had training in an institution.

6. Output Projections

From the 1977 enrolment projections we have derived in a similar way output in 1977 from the institutions surveyed. This is shown at Appendix 4. By interpolation we are able to estimate output from each course in the interviewing years and thus to get a picture of total output from these institutions for the whole of 1972 - 1977. Starting from the 1972 stock in the relevant manpower categories, as estimated in the 1972 Manpower Survey[17], it is possible to get a rough idea of additions to stock from all sources and thus of the possible size of the stock in 1978.

Our methodology is as follows.

(a) For each occupational category (somewhat aggregated to fit in with available statistics) we show the stock in 1972 as estimated by the Manpower Survey[18] and also the number and proportion of non-citizens.

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17. Central Bureau of Statistics, A Preliminary Report on the Kenya High and Middle Level Manpower Survey 1972, Kenya Statistical Digest, Vol.X, No.4, December 1972.

18. Ibid.

TABLE 8: OUTPUT BY INTENDED OCCUPATIONS, LEVEL & SECTOR, (1972)

PROFESSIONAL	TECHNICAL	AGRICULTURE	BUSINESS	OTHER	TOTAL
Electrical & Electronic Engineers	17				17
Mechanical Engineers	8				8
Jurists			13		13
TOTAL PROFESSIONAL	25		13		38
SEMI-PROFESSIONAL					
Physical Science Technicians	34				34
Draughtsmen	2				2
Engineering Technicians (Construction)	163				163
Engineering Technicians (Mechanical & Motor Vehicle)	226				226
Engineering Technicians (Aeronoutical)	31				31
Engineering Technicians (Water)	20				20
Engineering Technicians (Electrical)	110				110
Engineering Technicians (Other)		17			17
Semi-Professional Agronomists	31	37			68
Agricultural Instructors & Extension Workers		103			103
Qualified Workers n.e.c. Farming etc.		75			75
Veterinary Assistants		89			89
Medical/Dental/Veterinary n.e.c.				20	20
Semi-Professional Accountants			130		130
Secondary Teachers Science				41	41
Secondary Teachers Technical				54	54
Government Administrators (S/P)			45		45
General Managers (S/P)			39		39
Farm Managers(S/P)		13			13
Managers nec & W.Ps (S/P)					46
Other Professional, S/P n.e.c.	7		88	15	110
TOTAL SEMI-PROFESSIONAL	624	334	302	176	1436
SKILLED & BELOW					
Clerical etc. Administrative Supervisors	11		67		78
Short Hand Typists etc.			1098		1098
Lower Accountants, Bookkeepers, Cashiers			188		188
Other Clerical n.e.c.	13		118		131
Specialised Sales, Service Workers				30	30
Production Supervisors, General Foremen	17	234	40		291
Tailors & Dressmakers	267				267
Patternmakers, Sewers, Upholsterers	29				29
Fitter-Machinists, Toolmakers	18				18
Non-Agricultural Fitters/ Assemblers	90				90
Motor Vehicle Mechanics	90				90
Agricultural Machine Fitters/Assemblers		10			10

TABLE 8: Cont.....

OUTPUT BY INTENDED OCCUPATIONS, LEVEL & SECTOR, (1972)

PROFESSIONAL	TECHNICAL	AGRICULTURE	BUSINESS	OTHER	TOTAL
Non-Agricultural					
Machinists/Repairmen	80				80
Electricians General	50				50
Plumbers & Pipe Fitters	35				35
Welders & Flame Cutters	19				19
Sheet & Structure Metal Workers	35				35
Compositors & Typesetters	14				14
Painters	23				23
Stonemasons/Bricklayers	110				110
Carpenters/Joiners	105				105
Other Construction Workers	20				20
Other Skilled n.e.c.	72				72
TOTAL SKILLED & BELOW	1098	244	1511		2883
FURTHER TRAINING					
Professional	56				56
Semi-Professional	25				25
Skilled	310				310
TOTAL FURTHER TRAINING	391				391
TOTAL	2138	578	1826		4748

(b) To this stock we add the estimated additions in each category during the period 1972-1977 from the institutions in our survey.

(c) From these additions we subtract the estimated number of non-Kenyans in each category.

(d) We further add the estimated output in 1972-1977 from institutions not covered by our survey and from on-the-job training.[19]

(e) We subtract the estimated wastage from the stock due to retirement, death etc., using the low rate of 0.4 per cent per annum recommended by Jolly and Colclough[20] for all categories.

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19. In the case of semi-professional occupations we assume this to be zero in the belief that most technicians do some courses at one of the Polytechnics and so are likely to be included in our survey figures. In the case of skilled occupations we have merely assumed that output from courses offloaded by the Polytechnics will continue at the same rate as before and as an approximation to output from on-the-job training and other institutions, have taken the estimated number of grade II trade test passes multiplied by the proportion that has not attended any of our surveyed institutions. To obtain the former we have merely assumed that the number in each category will remain the same as the annual average for 1971 and 1972. The latter was obtained from interviews of trade test candidates in January/February 1973, the results of which have not yet been analysed. At any rate, while hardly likely to be accurate these figures may approximate to the minimum output from on-the-job training in each category. That it is a minimum can be gathered from the implied pessimistic assumption that the extension of the national industrial training scheme will not affect the output of trained people but merely formalise what is going on already.

20. Richard Jolly & Christopher Colclough: African Manpower Plans: an Evaluation. International Labour Review, 106, (2-3), August - September, 1972.

(f) This gives a figure for total stock in 1978 and an implied annual average rate of growth for 1972 - 78, on the assumption of zero Kenyanisation.
(g) We then subtract the number of non-citizens in each category in 1972 to obtain, at the other extreme, stock in 1978 and annual average rate of growth on the assumption of 100 per cent Kenyanisation

The results of our exercise are set out in Table 9. These figures should not, of course, be regarded as indicators of the precise numbers in each category. Even as orders of magnitude they need to be carefully qualified. It did not, for instance, prove possible to obtain accurate estimates of the numbers likely to be returning from abroad. It seemed, however, from Ministry of Education records, that most students overseas were studying at a higher level than is of interest to us The categories for which overseas training (mainly in the UK), is most important have been identified in a footnote to the table. We have no information, also, on the extent of private study, which may have led to an underestimate of output in categories where it is important such as office workers (9, 10, 12, 13, 14, 16 and 17 in Table 9). Moreover, training does not necessarily determine job choice. Trained plumbers may end up as computer programmers and vice versa

After some thought, we decided not to attempt projections of demand for individual categories, mainly because available methodologies are so dubious that the results of such exercises are likely to be positively misleading.[21] The manpower survey asked employers about their number of current vacancies in each category but deliberately refrained from defining "vacancy" Thus we can use their answers cautiously as a qualitative guide to relative current shortages in different occupations, although the precise numbers have little meaning. Accordingly we have identified in footnotes to Table 9 those categories whose current vacancy rate is above average and those below average.

An interesting aspect of employers' answers to the question about vacancies is the picture they give of relative shortage at semi-professional and at skilled level. Overall there is little difference in vacancy rates between these groups, and the rates for some skilled categories are particularly low. This apparently contradicts the verdict of successive commissions of enquiry such as the Wamalwa committee[22] which designated craft training as the area "where the major numerical requirement exists" and said that "the need for

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21. Our supply projections are, however, set out in such a way that they could be cautiously compared with the official manpower projections when these become available

22. (Wamalwa) Report of the Training Review Committee. Nairobi, Government Printer, 1972

TABLE 9: 1972 STOCK AND 1972-77 PROJECTIONS OF OUTPUT IN SELECTED OCCUPATION CATEGORIES

	1972 Stock	of which Non-citizens		plus 1972-77 Additions from Surveyed Instit.	Less Non-Kenyan Additions	plus 1972-77 Additions from on-the-job Training and other Institut.	Less Wastage	1978 Stock if Zero Kenyani tion.
		Number	%					
Semi-Professional								
Physical Science technicians[b]	535	124	23	+334			-11	85
Draughtsmen	463	73	16	+ 31			-10	48
Engineering technicians[ab]	3513	1224	35	+3515	-47		-74	690
Semi-professional agronomists[c]	651	108	17	+ 461	-27		-14	107
Agricultural Instructors and extension workers[c]	2240	19	1	+1054	-26		-47	322
Qualified workers n.e.c. farming etc.[c]	929	43	5	+ 708	-206		-20	141
Life Science technicians[ab]	749	86	11	-			-16	73
Veterinary Assistants[c]	123	0	0	+ 582	-54		- 3	64
Statistics/mathematics technicians[ab]	100	22	22	-			- 2	9
Semi-professional accountants[b]	2571	715	28	+1049	-38		-54	352
Secondary level teachers (technical)	376	142	38	+ 386			- 8	75
Semi-professional n.e.c.	1498	520	35	+ 645			-31	211
Total Semi-professional in these categories	13748	3076	22	+8765	-398		-290	2182
Skilled								
Clerical etc administrative supervisors[a]	2306	588	25	+ 364	- 18		- 48	260
Government executive officials	680	140	21	+ 295			- 14	96
Shorthand typists	5124	1238	24	+7996			-108	1301
Lower accountants, bookkeepers	4054	243	6	+1665			- 85	563
Other clerical etc n.e.c.	9765	827	8	+ 831	-128		-205	1026
Specialised Sales, service workers	3696	1410	38	+ 270			- 78	388

1972-77 PROJECTIONS OF OUTPUT IN SELECTED OCCUPATION CATEGORIES

zens %	plus 1972-77 Additions from Surveyed Instit.	Less Non-Kenyan Additions	plus 1972-77 Additions from on-the-job Training and other Institut.	Less Wastage	1978 Stock if Zero Kenyanisation.	Implied Annual Average Growth Rate	1978 Stock if 100% Kenyanisation	Implied Annual Average Growth Rate
23	+334			-11	858	8	734	5
16	+ 31			-10	484	1	411	fall-
35	+3515	-47		-74	6907	12	5683	8
17	+ 461	-27		-14	1071	9	963	7
1	+1054	-26		-47	3221	6	3202	6
5	+ 708	-206		-20	1411	7	1368	7
11	-			-16	733	fall	647	fall
0	+ 582	-54		- 3	648	32	648	32
22	-			- 2	98	fall	76	fall
28	+1049	-38		-54	3528	5	2813	fall
38	+ 386			- 8	754	12	612	8
35	+ 645			-31	2112	6	1592	1
22	+8765	-398		-290	21825	8	18749	5
25	+ 364	- 18		- 48	2604	2	2016	fall
21	+ 295			- 14	961	6	821	3
24	+7996			-108	13012	17	11774	15
6	+1665			- 85	5634	6	5391	5
8	+ 831	-128		-205	10263	1	9436	fall
38	+ 270			- 78	3888	1	2478	fall

TABLE 9 Cont.....

1972 STOCK AND 1972-77 PROJECTIONS OF OUTPUT IN SELECTED OCCUPATION CATEGORI

	1972 Stock	of which Non-citizens		plus 1972-77 Additions from Surveyed Instit	Less Non-Kenyan Additions	plus 1972-77 Additions from on-the-job Training and Other Institut.	Less Wastage	1978 Stock if Zero Kenyan-isation
		Number	%					
Production supervisors, general foremen[c]	3152	744	24	+2055	- 78		- 66	5063
Tailors, dressmakers, patternmakers etc.	2940	950	32	+2949		+234	- 62	6061
Blacksmiths and tinsmiths	225	9	4	-		+ 24	- 5	244
Motor vehicle mechanics[c]	3050	260	9	+ 530		+564	- 64	4080
Mechanics/repairmen[c]	1224	250	20	+ 602		+ 72	- 26	1872
Fitters/machinists/assemblers, toolmakers etc.	2178	167	8	+ 509		+474	- 46	3115
Electrical/electronics workers	1720	280	16	+ 380		+351	- 36	2415
Plumbers etc.[c]	246	60	24	+ 332		+ 54	- 5	627
Welders etc.[c]	642	50	8	+ 124		+108	- 13	861
Sheet/structural metal workers[c]	410	79	19	+ 206		+ 30	- 9	637
Printers[ac]	1467	111	8	+ 170		-	- 31	1606
Painters[b]	269	23	9	+ 173		+510	- 6	946
Stonemasons/bricklayers and other construction workers[b]	1610	256	16	+ 887		+900	- 34	3363
Carpenters/joiners and other woodworkers[b]	1488	304	20	+ 458	- 26	+462	- 31	2351
Other skilled n.e.c.	810	54	7	+ 301		+201	- 17	1295
Total skilled	47,056	8043	17	+21,097	-250	+3,984	-989	70,898
Total	60,804	11119	19	+29,862	-648	+3,984	-1,279	92,723

[a]Categories in which overseas training is important.

[b]Current vacancy rate above average.

[c]Current vacancy rate below average.

Source: Follow-up Survey, Trade Test Results and Central Bureau of Statistics /17.

D 1972-77 PROJECTIONS OF OUTPUT IN SELECTED OCCUPATION CATEGORIES

h izens	plus 1972-77 Additions from Surveyed Instit	Less Non-Kenyan Additions	plus 1972-77 Additions from on-the-job Training and Other Institut.	Less Wastage	1978 Stock if Zero Kenyan-isation	Implied Annual Average Growth Rate	1978 Stock if 100% Kenyan-isation	Implied Annual Average Growth Rate
%								
24	+2055	- 78		- 66	5063	8	4319	5
32	+2949		+234	- 62	6061	13	5111	10
4	-		+ 24	- 5	244	1	235	1
9	+ 530		+564	- 64	4080	5	3820	4
20	+ 602		+ 72	- 26	1872	7	1622	5
8	+ 509		+474	- 46	3115	6	2948	5
16	+ 380		+351	- 36	2415	6	2135	4
24	+ 332		+ 54	- 5	627	17	567	15
8	+ 124		+108	- 13	861	5	811	4
19	+ 206		+ 30	- 9	637	8	558	5
8	+ 170		-	- 31	1606	1	1495	0
9	+ 173		+510	- 6	946	23	923	23
16	+ 887		+900	- 34	3363	13	3107	12
20	+ 458	- 26	+462	- 31	2351	8	2047	6
7	+ 301		+201	- 17	1295	8	1241	7
17	+21,097	-250	+3,984	-989	70,898	7	62,855	5
19	+29,862	-648	+3,984	-1,279	92,723	7	81,604	5

ning is important.

e.

e.

Results and Central Bureau of Statistics /17.

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technician training will not be so great as for craftsmen." It also apparently contradicts the similar impression we gained from talking to employers and trainers. Apart from the ambiguity of the 'vacancy' concept the explanation probably lies in the occupational definitions used by the 1972 Manpower Survey. Skilled-level clerical and craft occupations were defined very restrictively by training and/or level of responsibility. Thus specialised sales or service workers "will usually have at least two years full-time specialised training, before they are fully qualified for their job" and craftsmen "must have passed or be able to pass at least trade test grade I or have equivalent qualifications." It comes, then, as no surprise to find that the total number in the high and middle level manpower category in 1972, at 99,821, is nearly 15,000 lower than the total in the 1967 survey which used much less stringent definitions. Nor is there necessarily any conflict between the low vacancy rates shown for skilled workers thus stringently defined and the widespread feeling that the real current shortage is at skilled level. If the Manpower Survey had included in its skilled category those in lower-paid artisan jobs, possibly with a grade III trade test certificate, probably without any formal training, but able to read and write, read a drawing and make a sketch, follow instructions and perform fairly simple technical tasks, it might have found much higher vacancy rates at this level.

Although we are avoiding detailed demand projections we need to make some broad assumptions about what will be happening on the demand side. In the new plan period, 1974 - 1978, the central assumption seems to be that economic growth will proceed at about the same rate as in the immediate past, i.e. at an annual average rate of about 8 per cent per annum at constant prices.[23] The manufacturing sector, it is assumed, will grow at a rather faster rate than this, as, presumably, will mining and quarrying, building and construction and services, while agriculture will tend to grow more slowly than the average. Jolly and Colclough[24] argue that the elasticities of educated manpower in employment and GDP, emerging from cross-sectional regression studies, of around 0.9 to 1, rather than higher or lower, can be taken as a guide to the order of magnitude of the maximum likely elasticity. If we accept their argument we would expect the growth in demand for higher and middle level manpower to proceed at a rate no faster than that of GDP, i.e. 8 per cent per annum. Of course individual occupations will be subject to special influences but it may be useful to bear this 8 per cent maximum overall growth rate in mind in looking at the growth rates on the supply side in Table 9.

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23. This is the growth rate for GDP assumed in the plan and is the same as that achieved in the period 1964 - 1970.

24. Jolly & Colclough. op. cit. p.226

In the light of which we can at least make some observations about the adequacy or otherwise of existing training provision for the occupational categories in these tables, overaggregated though they are.

Two categories immediately attract attention as showing a fall in stock in the 1972-78 period even in the absence of Kenyanisation. These are life science and statistics/mathematics technicians. Some purely on-the-job training has certainly escaped our net, and these are both categories in which overseas training is common. Nevertheless they are areas worth the attention of planners of new training facilities.

Categories showing very low rates of increase are, at semi-professional level, draughtsmen and at skilled level, several categories of clerical workers and supervisors, blacksmiths and tinsmiths and printing workers. Well-trained high-grade clerical staff would undoubtedly find a ready market. The shortage of blacksmiths etc looks less urgent when they are lumped together with fitters and machine operators; even when current vacancies are taken into account the effective growth rate for the group as a whole is fairly high. There certainly seems to be scope for an increase in the output of locally trained printing workers but new facilities need not be built until those at Kenya Polytechnic are fully utilised.

Categories in which an expansion of training might enable a faster rate of Kenyanisation include semi-professional accountants and electrical workers. The former is a category in which a particularly high rate of vacancies was reported. The category, semi-professional n.e.c., also belongs in this group but is too heterogeneous to be a useful guide to training needs.

The dangers of being overinfluenced by the current state of the market are illustrated by those categories in which there is a high current vacancy rate but also a high rate of planned expansion of output. Engineering technicians is an interesting category within this group since many of the institutes of technology have based their plans on the supposed shortage of technicians. This might even be regarded as a category in which accelerated Kenyanisation will become necessary to avoid a surplus. Unfortunately the manpower survey did not distinguish between different types of technician. Further investigation would be needed for this purpose. In the same group, but with less scope for Kenyanisation, are building workers. Here we should distinguish between painters, stonemasons/bricklayers and carpenters/joiners in descending order of rate of planned expansion.

Finally there are those categories which, on the face of it, seem to be adequately provided with training facilities. These include the painters mentioned above, plumbers, tailors and shorthand-typists (not secretaries).

At semi-professional level veterinary assistants are in this group and agricultural semi-professionals as a whole (categories 4, 5, 6 and 8) are interestingly unique in showing a zero current vacancy rate.

The latter is a symptom of a problem which faces all types of agricultural training at skilled level and above. Who, apart from the government, will give what is regarded as sufficiently lucrative employment to those who have received such training? Dairy managers trained at Naivasha may be offered less than 150 sh per month by cooperative societies. Farm managers trained at Thomsons Falls may get as little as 50 sh per month. In the circumstances it is hardly surprising that such trainees do not stay long in jobs that make use of their (fairly expensive) training. Meanwhile, as evidenced by the zero vacancy rate, the Ministry of Agriculture is saturated with the products of Egerton, Embu and AHITI, and the rate at which such employment can grow is severely limited by budgetary constraints. It is true that there are still 490 non-citizen farm managers to be replaced (about 12 per cent of the total) but existing institutions are more than capable of performing such a task; indeed it may be necessary for them to do so in order to avoid underutilisation of their facilities. All this is yet another illustration of the distinction between 'need' and 'demand'. Kenyan agriculture may 'need' more higher level trained people but, at existing supply prices, it does not seem to 'demand' them.

7. Cost and Financing

Information on cost and financing has been gathered from a variety of sources, but mainly from the MFEP survey. Coverage is patchy but sufficient to encourage hypotheses about the reasons for cost differences between different institutions. The data are presented in Table 10.

Fields[25] calculated gross current cost per pupil in 1970 for both Embu Institute of Agriculture (enrolment 145, according to the survey) and AHITI (227) at 5,000 shillings. These would go into our agricultural semi-professional (boarding) category, although at a lower level than Egerton college. It should be noted that several of the institutions in the 'below-skilled' category have social purposes additional to those of training, which may affect the cost of their operation.

The figures would seem to support the fairly obvious hypotheses that, ceteris paribus, the lower the level at which the training is being given the lower it is possible[26] to reduce cost per student (e.g. compare CITC Mombasa with

25. Gary S. Fields. The Educational System of Kenya: an Economists' view. I.D.S. Discussion Paper No. 103, 1971

26. It is also possible, of course, to have extremely expensive institutions at any level, e.g. KIMC and KITI.

TABLE 10: COST AND FINANCING BY TYPE OF INSTITUTION,* 1970

	Gross Current Cost ('000shs)	Number of Students	Current Cost per Student (shs)	Number of Teaching Staff	Student/ Staff Ratio	Total Fee Revenue ('000shs)	Fee Revenue as % of Current Cost	Other Sources of funds ('000shs)
TE HN./INDUST								
SEMI-PROFESS.								
NON-BOARDING								
Kenya Polytech.[h]	5,972	1,482[a]	4,030	120	12	1,141	19	2,361[b]
Kenya Inst of Mass Comm[j]	1,314	65	20,215	9	7	0	0	1,314[b]
SKILLED/BOARDING								
Mombasa Poly.[h]	2,192	599[a]	3,659	26	23	333	15	986[b]
Kenya Ind Trng. Institute[j]	970	64	15,156	11	6	40	4	650[b]
BELOW-SKILLED BOARDING								
NYS VTU Mombasa[h]	952	206	4,621	31	8	0	0	742[b]
BELOW-SKILLED								
NON-BOARDING								
CITC Mombasa[h]	163	104	1,567	9	12	23	14	70[c]
CITC Nairobi[h]	257	144	1,785	14	10	58	23	120[d]
YMCA Crafts Training Centre[h]	120	33	3,636	8	4	9	8	90[e]
AGRICULTURAL								
SEMI-PROFESS. BOARDING								
Egerton College[h]	6,235	587	10,622	39	15	2,940	47	2,217[b]
Forest Trng School[j]	295	59	5,000	3	20	0	0	295[b]
BELOW-SKILLED BOARDING								
Limuru Boys Centre[h]	200	48	4,166	6	8	0	0	140[f]
BUSINESS/ADMIN.								
SEMI-PROFESS. BOARDING								
Strathmore Sch. of Accountancy[h]	591	87	6,793	4	22	503	85	8[g]

[a] Full-time equivalent [b] Central government [c] Overseas donations
[d] Technical assistance [e] Sponsorship [f] Donation [g] Loans [h] Source: MFEP survey
[j] Source: Dorothy Thomas, Who Pays for Adult Education in Kenya?, Board of Adult Education, 1971.

* The level of an institution is that at which the majority of training is given. Cost includes estimated cost of posts financed directly from overseas, but excludes depreciation allowance.

Kenya Polytechnic or AHITI and Embu with Egerton College); that boarding institutions are more expensive than non-boarding (e.g. compare Mombasa with Kenya Polytechnic); that there are economies of large - scale enrolment (e.g. compare Kenya Polytechnic with KIMC or Mombasa Polytechnic with KITI); that there are economies of large proportion of students enrolled on part-time courses, evening, sandwich or day-release (e.g. compare Kenya Polytechnic with most of the other institutions). Overall, indeed, one of the most striking aspects of the table is the relatively low current cost per (full-time-equivalent) student achieved by Kenya Polytechnic, attributable, perhaps, to its large size and its largely non-boarding and part-time character. The fact that a large proportion of its students are able to get a large part of their practical training on the job means that the Polytechnic does not need to go in for expensive simulation of industrial conditions.

One of many important institutions not included in Table 10 is the NIVTC. This has achieved a significant reduction in unit cost in recent years Its allocation for current expenditure in 1972/3 is about 1.5 mn shs. To this we should add the 1.6 mn. shs or so of current expenditure financed by UNDP and CIDA, to give a total of some 3.1 mn. shs. Dividing this by the 6,000 man-weeks of training estimated to be carried out in this period we get a unit cost figure of 517 shs. per man-week. When the instructor - intensity of a "man-week" in the type of course offered by NIVTC, the fact that nearly all of the local staff spend more than half their time on trade-testing and the high cost of the UNDP - financed specialists are taken into account, this is not a high figure compared with unit cost in say, KITI. It suggests that the main reason for the high cost of a few years ago was underutilisation of staff and capacity.

Some interesting comparisons can be made between costs of technical/ vocational education and training and costs in other parts of the educational system. Table 11 is extracted from data collected by Fields[27] for 1970[28].

As can be seen from a comparison of Tables 10 and 11 the two polytechnics are not much more expensive in terms of cost per student than the average primary teachers' college. Even the cheapest of the technical training institutions, however, costs more to run per student than does the average academic secondary school, while KIMC and KITI are- of the level of the university in their unit cost and Egerton College is not far behind.

The figures on fee revenue as a proportion of current cost, in Table, should be interpreted with care since in many cases (e.g. Egerton and Strathmore

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27. Ibid.

28. Since 1970 experience with unit cost has been varied. Official estimates of gross current cost per pupil in 1972 (enrolment figures in brackets) are as follows: all primary schools, 250 shs (1.7 mn.); government secondary schools 1,662 shs (83,810); secondary technical and vocational schools, 2,242 shs (5,050); primary teachers' colleges, 3,320 shs (7,290); University of Nairobi, 18,740 shs (4,140).

TABLE 11: EDUCATIONAL COSTS, 1970

	Number of Schools	Total Enrolment	Gross Current Cost ('000shs)	Gross Current Cost per Pupil (Shs)
Primary (rural))		1.1mm	280,000	255
)	6,065			
Primary (municipal))		91,000	44,260	486
Govt. Secondary Schools incl. Forms 5 & 6	300	74,561	90,900	1,219
Secondary technical Schools	4	1,908	4,027	2,110
Secondary vocational Schools	8	2,424	5,600	2,310
Primary teachers Colleges	26	5,740	18,940	3,300
Kenyatta College		900	5,000	5,556
Kenya Science Teachers College		357	3,340	9,356
University of Nairobi		2,056	35,940	17,481

Source: Fields op.cit.

Colleges) fees are paid by employers - in Egerton's case, that is, by the government. In general, as can be seen, there is heavy reliance on sources of revenue other than fees.

B. THE PLANS OF THE PROPOSED INSTITUTES

Before the implications of section A for the prospects facing the harambee institutes can be discussed we need to review briefly the plans of the institutes as far as they are known.[29] The plans are at various stages of development and, to judge by the extent to which they have already changed since they were first announced, will probably turn out in most cases to be of mainly historical interest. However, for the moment they are the only available indicators of the institutes' intentions.

Central Province contains the institute at the most advanced stage of planning, Kiambu Institute of Science and Technology. Total capital cost is estimated at 18 mn. shs. Towards this 7 mn. shs has been raised locally and a further 6.7 mn shs has been donated by the Dutch government through a church organisation. A project director and two full-time staff members are already in residence at the Kiambu site, where the buildings, the contract for which has been given to an African firm, are going up fast. Further staff members are due to arrive soon and the first students, it is hoped, will start their

29. As at April 1973.

courses in August 1973. KIST will be primarily a boarding institution with EACE as the normal entry requirement. The two courses for which plans are firm are building trades and secretarial work. The first will be a three-year course, taking students in their first year up to the level of form IV in a secondary technical school and combining work at the institute with on-the-job training; the final product will be something between a craftsman and a technician. The secretarial course will offer the opportunity of a second year's training to those who have successfully completed the first year and will also take suitable direct entrants into this second 'upgrading' year. Plans are less firm for other courses but they are likely to be in engineering, agriculture and accountancy, it seems likely that the engineering course would be at a similar level to the building trades course (i.e. between craft and technician) while agriculture and accountancy might be semi-professional courses. Table 12 is a rough guide to the numbers likely to be involved:

TABLE 12: PLANNED ENROLMENT AND STAFFING, KIAMBU I.S.T. 1973-1976

	1973	1974	1975	1976
Building Trades	75	150	225	225
Secretarial	50	100	100	100
Engineering			100	200
Agriculture		25	50	50
Accountancy		25	50	50
Total Enrolment	125	300	525	625
Teaching Staff	10	18	27	36
of which expatriates	8	14	20	20

Source: K.I.S.T.

The planners of the institute are emphasising self-employment as a destination for K.I.S.T. graduates, particularly, to start with, those with building skills. Current expenditure per student at full capacity is expected to be around 6,000 shs. The level of fees has not yet been fixed but the chairman of the board of trustees has talked of the possibility of holding them down to an average of about 1,000 shs, which would leave a large current deficit. This could be partly met in the early years from profits from the 200-acre coffee farm in which K.I.S.T. is located (estimated at 400,000 shs p.a.), income from the sale of students' products and services, the donation of teachers (mainly volunteers) by overseas governments and local fundraising. The two last sources of finance can hardly be relied on in perpetuity, however, and it will be necessary for the central government to step in eventually with finance for the salaries of local teachers. This expectation is built into the planning of Kiambu Institute of Science and Technology.

The planners of Kimathi Institute of Technology, to be located in Nyeri, are following a low-profile policy. The fund-raising target is 10 mn. shs, and the total collected by May 1973 was 1.7 mn. shs. From the proposals put to the initial meeting of leaders in July 1971 we can gather that the original intention was to cater for E.A.C.E. holders and to produce "engineers, technologists, technicians, nutritionists and caterers" through three-year courses. A boarding institution with an initial enrolment of 500 rising to 1,000 was envisaged with fees as high as 2,000 shs per student. The staff: student ratio was to be 1:25, implying an initial need for 20 teachers, rising to 40. It must be emphasised, however, that these were the original proposals, quoted only in the absence of more recent information.

The target for Kirinyaga Technical Institute, to be built at Giathari near Kerugoya, is 10 mn. shs, of which by December 1972 1¼ mn. shs had been collected. K.T.I. will be a boarding institution with a 500 - student capacity. Contrary to press reports that the institute will cater for primary-school-leavers, the normal entry requirement will be E.A.C.E., but a few CPE - holders will be admitted. There will be one purely academic stream which will sit EACE basic scientific knowledge after one year and EACE science a year later. The remaining three quarters of the students will take courses, apparently at technician level, in mechanical, agricultural and electrical engineering, and, apparently at skilled level, in joinery, building, technical drawing, electricity, mechanics, tailoring, design fashion and handicrafts and music and drama. Once again all these details are from early outlines of the institute's intentions and are highly likely to be superceded by revised plans.

Murang'a College of Technology, like Kiambu, has some buildings on the ground, but it is not as far forward in fund-raising or planning. Over 4½ mn. shs have been raised locally but, in the absence so far of large-scale overseas aid, this is still a long way from the 10 mn. shs target. An initial capacity of about 500 students is envisaged, most of them boarding, with the possibility of expansion later in the 'seventies subject to the availability of further funds. The first intake, 200 holders of EACE and above, will be admitted in late 1974. There will be two levels of training - craft and technician. After a short pre-entry course and selection process, a craft trainee will take City and Guilds course 833 or its equivalent, lasting about 1½ years. He will then either be selected for transfer to a technician level course or continue with a further 1½ - year craft-level course in a mechanical electrical or building specialisation, working his way up to a grade I trade test certificate. The technician course will last three years and will take direct entrants (probably EAACE holders) as well as transfers from the craft course. Specialisations will include mechanical engineering technician,

motor-vehicle technician, electrical engineering technician, building and civil engineering technician and ordinary diploma in engineering. Products of both courses will enter industry at approximately the level of under-foreman, with the technician progressing upwards after gaining experience at that level. The assumption seems to be that all will find wage-employment in the formal sector. Estimates of current cost, staffing requirements etc. are not yet available.

In Eastern Province at least 660,000 shs have been collected towards the 3 mn. shs needed for Embu Karurumo Polytechnic. This represents, unlike most of the other institutes, the upgrading of an existing institution, Karurumo Village Polytechnic, hence the relative modesty of the fund-raising target.[30] Indeed, in spirit, with its admission of primary school leavers and emphasis on extension and local self-employment, it belongs more with the village polytechnic programme than with the "institutes of advanced technology". Training plans have not yet been finalised but they could include relatively low-level training in agriculture, building carpentry, plumbing, mechanics and fitting, animal husbandry, charcoal production, baking, homecraft, tourism, electricity, village technology, tailoring,driving and book-keeping. By 1974/5 an enrolment of about 390 would be possible, compared with 189 in 1972/3, at a current cost per student of as little as 710 shs. Nevertheless : with fees as low as 150 shs p.a., notwithstanding the aid likely to come from the government's youth development division, a large part of current costs will have to be financed by local fund-raising.

The leaders of Meru College of Technology are so preoccupied with the problems of fund-raising that they have had little time for planning. Indeed by February 1973 no more than 100,000 shs had been collected towards the target of 10 mn. shs, and the Meru branch of the Local Government Workers Union resolved to donate 20 per cent of February's salaries to save the college from "collapsing". A 300-acre site has been chosen at Nciru but nothing is known of plans for curriculum or syllabus, apart from the fact that when the idea was originally floated the proposal was for courses in agriculture ("agricultural technology, agricultural economics, hydrology, crop and animal husbandry, dairy technology, veterinary" subjects were specifically mentioned.)

Ukamba Agricultural Institute, like Kimathi I.T., has kept quiet about the progress of fund-raising towards its 30 mn. shs target and,.indeed, its campaign has lain sadly dormant. It is planning to concentrate on

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30. Although the target is not as modest as would, in principle, have been possible given village polytechnic aims.

"agricultural engineering and related subjects", which include soil and water engineering, irrigation and hydrology, meteorological studies, farm machinery, implements and related rural industries. Although UKAI's publicity director has said that it will concentrate on "more advanced aspects of agriculture" the level at which it will operate has not yet been settled. A site has been chosen at Yatta, on the border between Machakos and Kitui.

In Nyanza Province the fund-raising target for Gusii Institute of Technology is 17 mn. shs, towards which 14½ mn. shs has been promised by (but not yet collected from) local teachers and pyrethrum, coffee and tea farmers. A central institute with a capacity of 500 to 600 and an EACE entry requirement is envisaged, supported by two or three schools training at craft level with a KJSE entry requirement. Planned opening date for the institute, which will be situated in Kisii town, is 1974. Subjects to be covered include mechanical, civil, agricultural and electrical engineering and business administration (including accountancy and secretarial work).

A technical school, to be known as Abakuria Technical High School, is to be built at Kihancha. Apart from its cost, estimated at 10 mn. shs, nothing is known about this project, but presumably it will cater for primary school leavers.

Ramogi Institute of Advanced Technology, with an estimated capital cost for phase one (1974-77) of 20 mn. shs, had by February 1973 collected about 3 mn. shs. Its first intake of 300 students is planned for July 1974, with a first-phase full-capacity enrolment of about 1,000 to be reached by 1976. A fully worked out plan is not yet available but a curriculum has been published in outline. Entry will be at two levels. EACE holders will take a three-year course of study leading to an apprenticeship qualification as a technician. EAACE holders, plus the best students from the technicians' course will take "an intensive course lasting 3 - 5 years which will lead to professionally registerable qualifications". Subjects will include environmental sciences, agricultural sciences (e.g. sugar technology, fish technology, food science and technology and nutrition), engineering, business and institutional management, art and design (e.g. industrial design, book production and design, fine art, pottery, textile design and architectural and building technology), paramedical science (e.g. medical technology, pharmacy and clinical sociology) and social sciences (e.g. economics, demography, sociology and human geography). Supplementary courses in general studies (e.g. the history of science and technology, African studies, literature and society and the influence of science on society) will be offered and thought is being given to a RIAT programme for training its own teachers. Salaried employment within the Nyanza area seems to be envisaged as the main destination of RIAT graduates. The institute's planners estimate

current expenditure at 2 mn. shs p.a. initially (presumably when enrolment is 300), rising to 10 mn. shs "when the institute is fully established" (presumably when enrolment is over 1,000). Towards this they hope to levy capitation fees which could be as high as 20,000 shs per student per year and to establish an endowment fund of 60 mn. shs, yielding an annual income of about 400,000 shs. They are also aware of the possibility of financial assistance from the central government at a later date.

In Rift Valley Province three institutes are envisaged. One, Maa Technical School, is on a smaller scale than the other institutes. It was due to open in January 1973 in a temporary camp in Kajiado township donated by the central government. The first intake was to be of 80 primary-school-leavers into courses in "carpentry, farming and other technical subjects lasting up to three years". Teachers - initially three are needed - are being provided by the P.C.E.A. A target of 1 mn. shs, to go towards running costs, has been set.

The Kalenjin Institute of Advanced Technology, with a fund-raising target of 10 mn. shs, is merely at the proposal stage. The probable location, if the project survives, is Kericho.

First in the field in the province was the Rift Valley Institute of Science and Technology. 1½ mn. shs were raised at its first meeting towards its target of 6 mn. shs. Courses are planned in the "whole field of agricultural science and technology", trade and commerce, physical education, natural resources (e.g. forestry and geology), engineering, architecture, home science and hotel management, crafts and cottage industries and public health. To judge from the Vice-President's remarks on the launching of the campaign the initial level of training will be relatively low (he spoke of the need for people" with simple skills ..... such as mechanics, welders and builders able to put up houses"),in which case a fairly flexible admissions policy will probably be followed, including primary-school as well as form-IV-leavers. A long - term objective, however, is "university college status" for R.V.I.S.T. A 2,700 - acre cattle farm has been purchased in the hope that its profits will contribute towards the financing of current expenditure.

The situation in Western Province is still not entirely clear. The Western College of Arts and Applied Science (Weco) had, by July 1972, collected 1 mn. shs towards its target of 20 mn. shs, without the benefit so far of a large local fund-raising meeting. Its planners envisage a three-phase development programme on three sites, with the administration and engineering and business faculties on a 100 - acre site at Kakamega, agricultural and veterinary sciences in Bungoma and medicine and nutritional sciences in Busia.

The programme for Kakamega has been worked out in some detail. The first intake of students is planned for October 1974, when 168 EACE - holders will be admitted, 120 into a three - year "higher technicians'" course in engineering (including general mechanical and motor vehicle, general electrical and electronic agricultural and water, building production and manufacturing) and 48 into a semi-professional business course (including accounting, finance, insurance and management). With admissions proceeding at a constant annual rate, enrolment in 1975/6 will be 336 (240 engineering, 96 business) and in 1976/7 504 (360 engineering, 144 business). Craft and lower technician courses will also be made available on a part-time or extension basis for those with lower entry qualifications. Current cost per student is roughly estimated at 10,000 shs. Self-employment is envisaged as a possible destination for Weco trainees.

Although Weco planners envisage a campus in Bungoma as an integral part of Weco, Bungoma leaders appear to have rejected this proposal and have begun to raise money for a separate Sang'alo Institute of Science and Technology Indeed, 315,000 shs of Weco's fund was collected in Bungoma and is being diverted towards Sang'alo, whose target is 5 mn. shs. The total raised by March 1973 was 2 mn. shs, and a further 1 mn. has been promised annually by the county council in the form of cesses on farmers. Sang'alo will build on the existing buildings and facilities of a 1,000-acre veterinary farm and veterinary science is expected to feature in the curriculum, along with agricultural technology, masonry and tourism. Planned opening date is mid-1973, with a first phase teaching staff of ten.

A college sponsored by the Quaker Society of Friends, variously known as Friends College, Kaimosi, and Kaimosi College of Research and Technology, opened in temporary buildings in 1971. Work has already started on a new 100-acre permanent site at an estimated capital cost of 5.3 mn. shs, towards which 760,000 shs had been collected by October 1972. With its US Quaker connections fund-raising is likely to be less of a problem for Kaimosi than for most other institutes. The minimum entry requirement is EACE - a one-year secretarial course and a three-year course in business management. In 1976 a two-year course in "agriculture and rural leadership" is to be added. Planned enrolment in Kaimosi, which is a boarding institution, is as shown in Table 13:

Annual output from the college at full capacity is likely to be 162, i.e. 60 secretaries, 57 business managers and 45 agriculturalists. Current expenditure in 1972 is estimated at 628,000 shs (12,060 shs per student) and in 1976 at 1.7 mn. shs (4,667 shs per student). Currently the various fees add

TABLE 13: PLANNED ENROLMENT AND STAFFING, FRIENDS COLLEGE, KAIMOSI, 1971-78

	1971	1972	1973	1974	1975	1976	1977	1978
Secretarial School	20	30	50	50	120	105	60	60
Business Management	10	22	70	130	180	200	200	200
Agriculture	—	—	—	—	—	55	100	100
Total	30	52	120	180	300	360	360	360
Teaching Staff	4	5	7	11	17	21	21	21

Source: Kaimosi College.

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up to 1,700 shs per student, which leaves a large gap to be financed from other sources.

The Coast Institute of Technology was launched in May 1972 with a fund-raising target of 20 mn. shs. Although the campaign went well at first, only 1.1 mn. shs had been raised by March 1973 and a meeting of Coast leaders was proposed to find out why Coast people were "not taking self-help projects seriously and to recommend a remedy". Plans are not advanced but a provisional list of subjects has been chosen including: for CPE holders and above, agriculture, fishing and animal production, skilled-level trades and crafts (e.g. welding, fitting etc), marine industries, tourism and commercial subjects; and for EACE holders and above, electrical, mechanical and civil engineering technician courses.

The plans and fund-raising progress of the institutes are summarised in Table 14. As can be seen the levels aimed at vary a great deal - from RIAT's near - university courses down to the village-polytechnic or technical - school curricula of Embu Karurumo or Maa. It should be noted that in most cases these are aspirations rather than plans. These aspirations have already been scaled down significantly since the first announcements and will undoubtedly be scaled down further in the face of fund-raising difficulties, increases in cost estimates and growing realisation of the difficulties involved in setting up and running high-level technical training institutions. The contents of Table 14 notwithstanding, it would still not be surprising to find the majority of institutes starting with courses at the skilled rather than semi-professional level. Another striking feature of Table 14 is the gap in fund-raising between targets and achievements. Apart from Embu, Maa, Sang'alo and Kaimosi, which are building on existing institutions, only two of the proposed institutes (Kiambu and Murang'a) look to be anywhere near their planned fund-raising targets. Any discussion of the prospects for the institutes and of their impact on Kenyan society and economy must take this into account.

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TABLE 1 : SUMMARY OF THE PLANS OF THE PROPOSED HARAMBEE INSTITUTES OF TECHNOLOGY.

	Kiambu I.S.T.	Kimathi I.T.	Kirinyaga T.I.	Murang'a C.T.	Embu Karurumo Polytech.	Meru C.T.	Ukamba A.I.	Gusii I.T.	Abakuria T.H.S.	Ramogi I.A.T.	Maa T.S.	Kalenjin I.A.T.	Rift Valley
Fund-raising target (mn.shs)	18	10	10	10	3	10	30	17	10	20	1	10	6
Amount so far collect.(mn.shs) at date in brack.	13.7 (Dec72)	1.7 (May73)	1.25 (Dec72)	4.5 (Sep72)	0.66 (Mar73)	0.1 (Feb73)	nk	nk	nk	3 (Feb73)	nk	nk	1.5 (Apr72)
Planned open.date	Aug73	nk	nk	late74	alr.op.	nk	nk	74	nk	Jul74	Jan73	nk	nk
Enrol.at initial full capacity	625	500	500	500	390	nk	nk	600	nk	1,000	240	nk	nk
Entry requirements													
EAACE				*		)				*		)	
EACE	*	*	*	*		r)	nk	*		*		) nk	*
KJSE						)		*				)	
CPE			*		*	)			*			)	*
Curriculum-subjects and level:									nk			nk	
Science: profes.										*			
semi-profess.										*			
skilled													*
other			*										
Engineering:prof.		*								*			
semi-profess.		*	*	*				*		*			
skilled	*		*	*	*			*			*		*
Design etc:Prof.										*			
semi-profess.										*			
skilled			*		*								*
Agriculture:prof.					)	)				*			
semi-profess.	*				)	*?)	*?			*			
skilled					*	)	)				*		*
Business(excl.secr.): profess.										*			
semi-profess.	*							*		*			
skilled					*			*					*
Secretarial	*							*					
Catering,tourism etc: profess.										*			
semi-profess.		*								*			
skilled					*								*

HE PLANS OF THE PROPOSED HARAMBEE INSTITUTES OF TECHNOLOGY.

C.T.	Embu Karurumo Polytech.	Meru C.T.	Ukamba A.I.	Gusii I.T.	Abakuria T.H.S.	Ramogi I.A.T.	Maa T.S.	Kalenjin I.A.T.	Rift Valley I.S.T.	Western C.A.A.S.	Sang'alo I.S.T.	Kaimosi C.R.T.	Coast I.T.
)	3	10	30	17	10	20	1	10	6	20	5	5.3	20
5	0.66	0.1	nk	nk	nk	3	nk	nk	1.5	1	2	0.76	1.1
72)	(Mar73)	(Feb73)				(Feb73)			(Apr72)	(Jul72)	(Mar73)	(Oct72)	(Mar73)
74	alr.op.	nk	nk	74	nk	Jul74	Jan73	nk	nk	Oct74	mid73	alr.op.	nk
00	390	nk	nk	600	nk	1,000	240	nk	nk	504	nk	360	nk

TABLE 1: Contd..... SUMMARY OF THE PLANS OF THE PROPOSED HARAMBEE INSTITUTES OF TECHNOLOGY

	Kiambu I.S.T.	Kimathi I.T.	Kirinyaga T.I.	Murang'a C.T	Embu Karurumo P.	Meru C.T.	Ukamba A.I.	Gusii I.T.	Abakuria T.H.S.	Ramogi I.A.T.	Maa T.S.	Kalenjin I.A.T.	Rift Valley I.S.T.	Western C.A.A.S.	Sang'alo I.S.T.	Kaimosi C.R.T.	Coast I.T.
Education:																	
profess.										*							
semi-profess.										*			*				
Medical: profess.										*							
semi-profess.										*							
skilled													*				
Other: profess.										*							
semi-profess.										*							
skilled			*														

nk = not known

Source: The Institutes and the Press.

C. PROSPECTS

By comparing the plans for expansion of the existing system (set out in section A) with the plans of the harambee institutes of technology reviewed in section B we can gain some idea of the prospects facing the institutes.

The first thing we have to make a guess about is the timing of the opening of the institutes and the form that they will take. If we took Table 14 at face value we would gather that by the end of 1974 no less than nine of the institutes would be in full swing. If we exclude the two which will be operating at a lower level (Embu and Maa) this adds up to a total enrolment at full capacity by about 1977 of over 4,000.[31] Whatever the level of operation we can see by reference to Table 1 that this would represent a massive addition to existing provision of formal technical and vocational training. If we assume that the institutes will operate at skilled level and above, their enrolment of 4,000 compares with the projected 1977 enrolment at this level in our surveyed institutions of 9,844 and with the thousand or more who will by this time be attending courses at the NIVTCs. However, to accept these estimates is probably to over-estimate the likely impact of the new institutes. As has been shown the process of raising capital is proving much more difficult than had perhaps been expected. How many institutes will 'succeed' in the sense of reaching their fund-raising targets will depend largely on how many are able to attract capital aid from overseas. In the absence of a crystal ball it is not possible to make predictions about this, but we can put matters in perspective by assuming that no further large-scale overseas capital aid will be forthcoming and that only those institutes which have already raised at least 40 per cent of their fund-raising target will go ahead as planned. This extreme assumption would allow through only Kiambu, Murang'a and Sang'alo. If we relaxed our assumption of no further overseas aid to allow for those with special access to foreign funds we would add Kaimosi to this list. Institutes which did not reach their self-imposed fund-raising targets would not, of course, have 'failed'; presumably they would go ahead as training institutions but necessarily at a lower level than planned. It must be emphasised again that this is only an extreme assumption for the sake of illustration and not a prediction, but if only four of the institutes operated exactly as planned, at skilled level and above, their combined enrolment by 1977 would total only about 2,000. Which at least serves to illustrate that the immediate impact of the new institutes may be much smaller than had originally been thought.

Requirements for technical teachers by the new institutes would depend on the student/staff ratio that is assumed. From the information in Table 5 and

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31. Assuming Sang'alo's full-capacity enrolment to be over 450.

Appendix 1 we can calculate the staff/student[32] ratio for all existing institutions in 1972 as 11, with institutions offering mainly technical and business training slightly above this ratio and agricultural institutions rather below it. But as Table 10 shows, such an average conceals a very wide range of individual ratios - for skilled-and-above institutions in 1970 ranging from KITI's 6 to Mombasa Polytechnic's 23. Only three of the institutes have stated their planned student/staff ratios, with Kimathi going for 25 and both Kiambu and Kaimosi deciding on 17. 25 looks rather high for the level of training envisaged, but 17 looks fairly realistic. At any rate, if we take it as our basis we can calculate teacher requirements by 1978 on various assumptions. First of all, we need to work out the requirements of the existing skilled-and-above institutions by that date, including for this purpose the secondary vocational and technical schools, with which staff are more or less interchangeable. Concentrating on technical/industrial courses (on the assumption that technical teachers will represent the crucial constraint) we can see from Tables 1 and 3 that enrolment on such courses in our surveyed institutions is projected to rise from 2,910 to 3,515 between 1972 and 1977. If we assume that the same rate of increase will continue for a further year we get an enrolment in such courses for 1978 of 3,651, which implies an increase in technical teacher requirements between 1972 and 1978 from about 194 to about 242. Since some 116 of the 1972 stock are non-citizens this implies a need for an output of Kenyan technical teachers between 1972 and 1978, even ignoring wastage, of 116 (to replace non-citizens) plus 48 (for growth) i.e. 164 in total. And this is just for the institutions in our survey. We need also to take into consideration the 1978 requirements of the secondary technical schools (officially estimated at 24), secondary vocational schools (192) and the NIVTCs (50). Since only 5 qualified Kenyans were teaching in these institutions in 1972, this implies a required output for their purposes, again ignoring wastage, of 261 between 1972 and 1978. Adding together our two sets of teacher requirements we get 164 + 261 = 425. On the output side we can see from Table 9 that projected output of technical teachers (from Kenya Polytechnic and later, the new Technical Teacher Training College) in this period is 386. We can add to this the 44 expected to return from training in Canada to give a total output of 430. Of course some of the higher-level courses in the Polytechnics will require university graduate teachers rather than people trained on a technical teachers' course and these should in principle, be deducted from our requirements figure, but this is likely to be a small proportion of the total and more than offset

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32. Full-time - equivalent student.

by wastage (including drift to other occupations) which we have not included in our calculations. At any rate we can summarise that, without putting too much store by the exact figures, existing plans for output of technical teachers are likely to be insufficient even for existing institutions. The additional teacher requirements of the harambee institutes by 1978, could range from 118 on our extreme 'pessimistic' assumption to 236 if we accept their plans at face value. Not all of these would be technical teachers but even if half were this would be enough to accentuate the shortage to crisis proportions. All this, of course, has been on the assumption of 100 per cent Kenyanisation and the situation would clearly be eased if recruitment from overseas could be relied on. We have already argued, however, (p.14) that technical training institutions are faced with a shortage not just of local staff but of staff as a whole. As the Wamalwa committee[33] has warned, "it would be most unwise to plan these colleges on the assumption that suitable training staff in adequate numbers can be obtained from overseas, since there is a global shortage of technical trainers". The use of overseas 'volunteers' can provide a breathing-space but is hardly a long-term proposition. Wamalwa's suggestion that "one of the colleges could make an important contribution by concentrating on training instructors" [34] appears to be under consideration by RIAT. This makes little sense in view of government plans to increase and centralise the training of technical teachers, but the institutes need to make their demands for teachers known to the government as soon as and in as much detail as possible to allow them to be taken into account in the planning of the new Technical Teacher Training College.

To judge from Appendix 3 one constraint which may well determine the initial level of operation of the institutes is the supply of suitable students. We have seen (p.16) that the demand for entrants with secondary technical/ vocational schooling by existing training institutions is likely to exceed supply in 1977. In view of this, institutes which offer skilled-and-above technical courses to secondary school leavers (as do most of them - see Table 14) may find that they have to give them some preliminary technical training.[35] It is interesting to note that both Kiambu and Murang'a recognise this need although the extent of their provision differs. A somewhat depressing feature of the institutes' plans as so far revealed is their concentration on EACE-holders and above. However, political as well as economic pressures may eventually force them to open their doors to primary-school leavers who, all the evidence shows, are just as capable as secondary-school leavers of benefitting from skilled-level courses.

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33. Wamalwa. op.cit. p.32
34. Ibid. p.32
35. Unless the standard of technical work in secondary technical/vocational schools improves such preliminary training might be needed by all entrants.

The crucial question about the institutes' prospects, but also the most difficult to answer, concerns the employment prospects for their trainees. These will depend to a large extent on the level and content of their curricula. The main impression gathered from the summary of their plans in Table is one of heavy emphasis on 'engineering' at both technician and skilled level. To take technician level first, it seems likely that if all the plans of all the institutes for training of engineering technicians were fulfilled this would result in over-supply, since (see Table 9) existing institutions are planning to increase the stock of such technicians at a rate of at least 8 per cent per year. At skilled level there is rather more scope for additional output since the projected rate of increase for 'engineering' craftsmen very broadly defined (categories 21 to 32 in Table 9) is only $5\frac{1}{2}$ per cent, starting from an initial stock of 14,529, although there are wide variations between different categories. The plans of all the institutes are not, however, all going to be fulfilled immediately and it may be worthwhile to look in more detail at those which are in a relatively healthy fund-raising position. Of these only Kiambu and Murang'a plan to operate in the engineering field. Kiambu is likely to have no immediate problem in placing the first products of its building trades course in 1975, although the market may become tighter later in the decade in view of the plans of other institutions. The first products of its engineering course in 1976, if these are well-trained mechanics, fitters machinists etc, will be highly employable. Murang'a's plans need further definition. In particular the question of whether employers will want 'ready-made' technicians or will prefer to combine on-the-job training with part-time courses as in the past needs to be investigated. However, the numbers involved will be small to start with and employment problems are unlikely to be serious at either technician or skilled level - at least as long as there are only two institutes in this field. Specialisations in this area which seem to be underendowed with training facilities to judge from our survey (see Table 9) and which are at least worth further investigation by individual institutes include draughtsmanship and printing, and perhaps welding, motor vehicle mechanics and electrical trades. Those which look unpromising on the face of it include painters and plumbers.

Only two institutes, RIAT and Rift Valley are planning to operate under the heading of 'science'. Their plans are not yet clear, but this is an area where several specialisations appear to lack local training facilities. In particular, statistics/mathematics technicians and life science technicians appear to be trained either overseas or on the job and reputable local courses might find a ready market. There may also be scope for more local training of physical science technicians. 'Design' covers a wide variety of courses, many

of which, especially those connected with tourism, are likely to be marketable. However, in a few cases courses are being planned in tailoring, which, to judge from our survey, is already rather oversubscribed.

The problems of training for employment in agriculture have already been discussed (p.25) and the discussion need not be repeated here. Suffice it to say that this is an area where existing training facilities at skilled-and-above level seem to be more than adequate in relation to effective demand (as opposed to 'need'). A possible exception is that of professional large-farm managers, where there is scope for a course but where the capacity (if not the will) to put it on appears to exist in existing institutions. An interesting possibility in agricultural training, which would not meet with any 'employment' problems, would be to supplement the work of farmer training centres and government extension workers particularly in relatively neglected areas.

The general idea of putting on business courses, envisaged by eight of the institutes, seems to be well-conceived and could be emphasised more. In particular, semi-professional accountancy (envisaged by Kiambu and Kaimosi) is a field in which not only is there a severe current shortage but where local training facilities are inadequate. At skilled level employers might prefer on-the-job training but well-trained clerical workers and supervisors should have no employment problems. More problematical is secretarial training, featuring in the plans of four of the institutes including Kiambu and Kaimosi. There seems little point in this if it is merely a replication of the shorthand/typing courses offered by the multitude of existing institutions, which plan to add to stock at a rate of at least 15 per cent per annum (see Table 9). However, the training of higher-level secretaries is another matter; this is a field in which there are few competitors.

With technical teacher-training already having been discussed (p. 38) and medical training outside our scope (and, one would have thought, subject to central planning), the only area remaining is the broad one of 'catering, tourism etc'. The corresponding job categories are the equally broad ones of 'semi-professional n.e.c.' and 'specialised sales, service workers'. Both are undersubscribed as far as training facilities are concerned but this information is too aggregated to be useful. Elkan[36] has suggested recently that, notwithstanding government plans to set up a Hotel Training Centre in Nairobi, additional courses in 'basic crafts, such as restaurant and bar work,

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36. Walter Elkan, Employment in the East African Hotel and Tourist Industries: a survey, Report for East African Community, March 1973.

kitchen work and housekeeping, might be viable. Indeed he specifically suggests (p.26) as "one possibility that should be explored" the provision of "some forms of hotel training at one of the projected Institutes of Technology, especially perhaps the one to be established at the Coast. In addition (p.41) there is need to give serious thought to the training of tour - leaders and of driver-guides".

To summarise on employment prospects there is no doubt that if all the institutes carried out all their plans excess supply of trained manpower would result, particularly in the case of engineering technicians. Alternatively, training institutions would be forced to work uneconomically below capacity in order to avoid contributing to excess supply. However, fund-raising difficulties make it unlikely that more than a few institutes will come into operation in the next year or two and current financing difficulties make it unlikely that many will be able to operate, to start with, at higher than skilled level at least in technical subjects. Thus their impact on the trained-labour market is likely to be smaller than seemed possible in the euphoric early days of the fund-raising campaigns. Nevertheless the need is likely to arise for some of their trainees to look for opportunities in self-employment rather than wage-employment. Indeed some of the institutes (most imaginatively, Kiambu) are making this an explicit aim of their training. It is not, however, easy to train young school-leavers for self-employment as the village polytechnics and the Kenya Industrial Training Institute have found.[37] Nor can it be assumed that the opportunities for lucrative self-employment are unlimited.

Finally, there is the question of cost. The extra capital investment involved in the institutes is huge - 205 mn. shs for all seventeen appearing in Table and 99 mn. shs for the nine already open or aspiring to open before the end of 1974. The unexpected difficulty in raising capital has already been mentioned several times and has been made the basis for our assessment of the institutes' immediate impact as moderate. All this could be changed, however, if other institutes followed Kiambu's success in obtaining large amounts of capital from overseas. There are obstacles to this, in particular the fact that as private institutions the institutes are only able to obtain aid from private agencies and not directly from governments, but the possibility cannot be ruled out and should be borne in mind in any interpretation of this paper.

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37. For further discussion of the problems involved see David Court: Dilemmas of Development: the Village Polytechnic Movement as a shadow system of Education in Kenya. IDS Discussion Paper No.156, November 1972. David Court: Village Polytechnic Leavers: the Maseno Story. IDS Working Paper No. 72, November 1972, and E.M. Godfrey: Education and Training for Small Business. in I.D.S. Occasional Paper No. 6, 1973.

The only large institutes to have produced carefully worked out current cost estimates are Kiambu and Kaimosi. Kiambu estimates its current cost per student at initial full capacity, and at 1973 prices, at about 6,000 shs, which makes it considerably cheaper than KITI but rather more expensive than Mombasa Polytechnic (see Table 10). Kaimosi hopes to reduce its current cost per student from an initial 12,060 shs to a full-capacity level of 4,667 shs, which would be below the level of the comparable Strathmore College but understandably so in view of Kaimosi's larger enrolment. RIAT and Weco both seem to be thinking in terms of a unit cost of 10,000 shs which looks feasible in the light of Table . If we return to our range of 1977 enrolments of page , we find that the seven larger institutes planning to open before the end of 1974 would have a total current expenditure at initial full capacity of about 33 mn. shs p.a. If we exclude those which seem too far from their fund-raising target to achieve such an early opening the remaining four (Kiambu, Murang'a, Kaimosi and Sang'alo), represent a total current expenditure of about 12 mn. shs annually.

How can current expenditure on this scale be financed? The most that Kiambu will be able to raise towards its unit cost of 6,000 shs through coffee sales, sale of students' products and services and donation of volunteer teachers from overseas is 3,000 shs per student. Other colleges have other schemes for raising current finance, including RIAT's endowment fund and Rift Valley's 2,700 - acre cattle farm, but all will be faced with a similar gap between current revenue and expenditure, far too large to be plugged by any reasonable scale of fees. The institutes' planners are aware of this problem and confidently expect help from the government once they are in operation. The government is certainly sympathetic towards the institutes. Indeed ministers and civil servants are, in their private capacity, actively promoting them, and the provincial administration provides the fund-raising organisation.[38] But educational expansion has already brought acute financial problems and the Ministry of Education is under pressure to stabilise its budget. Any schemes to reduce the need for high fees and/or government subsidy, such as employer sponsorship or participation in the national industrial training scheme, need to be carefully investigated.

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38. For evaluation of these points see G.C.M. Mutiso & E.M. Godfrey: Some Political Aspects of Kenya's Harambee Institutes of Technology. Paper for the U.S.S.C. Conference, December 1972.

APPENDIX 1: ENROLMENT BY INSTITUTION, STUDENTS' SPECIALISATION, QUALIFICATION AIMED

	TECHNICAL/INDUSTRIAL						AGRI-	BUSINESS/	
		Engineering				Design &	CULT-	ADM.	Cate
	Scien.	Elect.	Mech.	Civ.	Other	Printing	H/craft	URE		Dom.
ANIMAL HEALTH AND INDUSTRY TRAINING INSTITUTE									
SEMI-PROFESSIONAL									
Final year								88	
2 years left							13	120	
Total							13	208	
BELOW SKILLED									
Final year							19		
Total							19		
ALL LEVELS									
Final year							19	88	
2 years left							13	120	
Total							32	208	
CHRISTIAN INDUSTRIAL TRAINING CENTRE, MOMBASA									
BELOW SKILLED									
Final year									
2 years left									
3 years left									
TOTAL									
CHRISTIAN INDUSTRIAL TRAINING CENTRE, NAIROBI									
BELOW SKILLED									
Final year									
2 years left									
3 years left									
TOTAL									
COOPERATIVE COLLEGE									
SKILLED									
Final year									60
TOTAL									60
DAIRY TRAINING SCHOOL, NAIVASHA									
BELOW SKILLED									
Final year								60	
TOTAL								60	

BY INSTITUTION, STUDENTS' SPECIALISATION, QUALIFICATION AIMED AT AND YEAR OF STUDY, 1972.

NICAL / INDUSTRIAL				AGRI-	BUSINESS/	OTHER			ALL
gineering		Printing	Design &	CULT-	ADM.	Catering,	Educa-	Misc.	
. Mech.	Civ.	Other	H/craft	URE		Dom.Sci.etc.	tion		COURSES
				88					88
			13	120					133
			13	208					221
			19						19
			19						19
			19	88					107
			13	120					133
			32	208					240
					60				60
					60				60
				60					60
				60					60

APPENDIX 1: Cont.....

	TECHNICAL/INDUSTRIAL							AGRI-CULT-URE	BUSINESS/ ADM.	OT Catering, Dom.Sci.etc
	Scien.	Engineering Elect.	Mech.	Civil	Other	Printing	Design & H/craft			
EGERTON COLLEGE										
SEMI-PROFESSIONAL										
Final year								148		
2 years left								157		
3 years left								191		
TOTAL								496		
ELDORET LARGE-SCALE FARMERS' TRAINING CENTRE										
BELOW SKILLED										
Final year								30		
TOTAL								30		
EMBU INSTITUTE OF AGRICULTURE										
SEMI-PROFESSIONAL										
Final year								76		
2nd years left								80		
TOTAL								156		
FOREST TRAINING SCHOOL, LONDIANI										
SEMI-PROFESSIONAL										
Final year								22		
2 years left								43		
TOTAL								65		
GOVERNMENT SECRETARIAL COLLEGE, MOMBASA										
SKILLED										
Final year									40	
TOTAL									40	
INSTITUTE OF TAILORING AND CUTTING										
SKILLED										
Final year							30			
TOTAL							30			
BELOW SKILLED										
Final year							227			
TOTAL							227			
ALL LEVELS										
Final year							257			
TOTAL							257			

AL / INDUSTRIAL			AGRI-	BUSINESS/	O T H E R			ALL
eering	Printing	Design &	CULT-	ADM.	Catering,	Educa-	Misc.	
ch. Civil	Other	H/craft	URE		Dom.Sci.etc.	tion		COURSES
			148			41		189
			157			42		199
			191			47		238
			496			130		626
TRE								
			30					30
			30					30
			76					76
			80					80
			156					156
			22					22
			43					43
			65					65
				40				40
				40				40
		30						30
		30						30
		227						227
		227						227
		257						257
		257						257

APPENDIX 1: Cont.....

	TECHNICAL/INDUSTRIAL						AGRI-CULTURE	BUSINESS/ADM.	OTHER			ALL COURSES
	Scien.	Engineering Elect.	Mech.	Civil	Other	Printing Design & H/craft			Catering, Dom Sci etc	Education	Misc.	
KENYA GOVT. SECRETARIAL TRAINING CENTRE, NAIROBI												
SKILLED												
Final year								81				81
TOTAL								81				81
KENYA INDUSTRIAL TRAINING INSTIT		10	40		10	20						80
SKILLED												
Final year		10	40		10	20						80
TOTAL		10	40		10	20						80
KENYA INSTITUTE OF ADMINISTRAT.												
PROFESSIONAL												
Final year								13				13
TOTAL								13				13
SEMI-PROFESSIONAL												
Final year								129				129
2 years left								77				77
TOTAL								206				206
SKILLED												
Final year								138				138
TOTAL								138				138
ALL LEVELS												
Final year								280				280
2 years left								77				77
TOTAL								357				357
KENYA INST.OF MASS COMMUNICATIONS												
SEMI-PROFESSIONAL												
Final year											15	15
2 years left											6	6
TOTAL											21	21

APPENDIX 1: Cont.

	Sci.	Elec.	Mech.	Civ.	Oth.	Pr.	D&H.	Agr.	B/A	Cat.	Ed.	Misc.	All
KENYA POLYTECHNIC													
PROFESSIONAL													
Final year		17	8										25
2 years left		10	6										16
3 years left		11	11										22
		38	25										63
SEMI-PROFESSIONAL													
Final year	65	110	250	142			7		114	46	54	20	808
2 years left	79	123	146	128			8		163	57	33	19	756
3 years left	41	132	186	113					72	34	29		607
4 years left	15	125								27	50		217
TOTAL	200	490	582	383			15		349	164	166	39	2,388
SKILLED													
Final year			98	45	64	8		10	157	30			412
2 years left			99			8		11	63				181
3 years left						22							22
4 years left						13							13
5 or more						28							28
TOTAL			197	45	64	79		21	220	30			656
BELOW SKILLED													
Final year					35	19							54
2 years left					91								91
TOTAL					126	19							145
OTHER													
Final year	56												56
2 years left	46												46
TOTAL	102												102

APPENDIX 1: Cont.

	Sci.	Elec.	Mech	Civ.	Oth.	Pr.	D&H.	Agr.	B/A	Cat.	Ed.	Misc.	All
ALL LEVELS													
Final year	121	127	356	187	99	27	7	10	271	76	54	20	1,355
2 years left	125	133	251	128	91	8	8	11	226	57	33	19	1,090
3 years left	41	143	197	96		22		17	72	34	29		651
4 years left	15	125				13				27	50		230
5 or more						28							28
TOTAL	302	528	804	411	190	98	15	38	569	194	166	39	3,354
LIMURU BOYS' CENTRE													
BELOW SKILLED													
Final year								24					24
2 years left								25					25
TOTAL								49					49
MOMBASA POLYTECHNIC													
SEMI-PROFESSIONAL													
Final year			7						14				21
2 years left			20						23				43
TOTAL			27						37				64
SKILLED													
Final year			28		254				44				326
2 years left		31	37	5	213				57				343
3 years left		14			28				34				76
4 years left		18			36								54
TOTAL		63	65	5	531				135				799
BELOW SKILLED													
3 years left					39								39
4 years left					50								50
TOTAL					89								89
ALL LEVELS													
Final year			35		254				58				347
2 years left		31	57	5	213				80				366
3 years left		14			67				34				115
4 years left		18			86								104
TOTAL		63	92	5	620				172				952

APPENDIX 1: Cont.

	Sci.	Elec.	Mech.	Civ.	Oth.	Pr.	D&H.	Agr.	B/A	Cat.	Ed.	Misc.	All
RAILWAY TRAINING SCHOOL.													
SEMI-PROFESSIONAL													
Final year				3									3
2 years left				2									2
3 years left				4									4
4 years left				1									1
TOTAL				10									10
SKILLED													
Final year				36					64				100
2 years left				4									4
3 years left				10									10
4 years left				12									12
TOTAL				62					64				126
BELOW SKILLED													
Final year				5					3				8
TOTAL				5					3				8
ALL LEVELS													
Final year				44					67				111
2 years left				6									6
3 years left				14									14
4 years left				13									13
TOTAL				77					67				144
SECRETARIAL COLLEGES - 6 RECOMMENDED BY FKE.													
SKILLED													
Final year									878				878
TOTAL									878				878

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APPENDIX 1: Cont.

	Sci.	Elec.	Mech.	Civ.	Oth.	Pr.	D&H.	Agr.	B/A	Cat.	Ed.	Misc.	All
STAREHE BOYS' CENTRE													
SKILLED													
Final year									20				20
2 years left									20				20
TOTAL									40				40
BELOW SKILLED													
Final year			27	24									51
2 years left			34	31									65
3 years left			32										32
TOTAL			93	55									148
			27	24					20				71
Final year			34	31					20				85
2 years left			32										32
3 years left			93	55					40				188
TOTAL													
STRATHMORE COLLEGE - SCHOOL OF ACCOUNTING.													
SEMI-PROFESSIONAL													
Final year									45				45
2 years left									50				50
TOTAL									95				95
THOMSON'S FALLS LARGE - SCALE FARMERS' TRAINING CENTRE													
BELOW SKILLED													
Final year								120					120
TOTAL								120					120
VOCATIONAL TRAINING UNIT, NATIONAL YOUTH SERVICE, MOMBASA.													
BELOW SKILLED													
Final year		40	86	180									306
TOTAL		40	86	180									306

APPENDIX 1: Cont.

	Sci.	Elec.	Mech.	Civ.	Oth.	Pr.	D&H.	Agr.	B/A	Cat.	Ed.	Misc.	All
WATER DEVELOPMENT TRAINING SCHEME.													
SEMI-PROFESSIONAL													
Final year				40									40
2 years left				28									28
3 years left				66									66
TOTAL				134									134
Y.M.C.A. CRAFTS TRAINING CENTRE.													
Final year							9						9
2 years left							10						10
3 years left				4			8						12
TOTAL				4			27						31
Y.W.C.A. VOCATIONAL TRAINING CENTRE.													
SKILLED													
Final year									26				26
TOTAL									26				26

Note: To avoid double counting, students who attend courses at both Kenya Polytechnic and another institution are counted as students of Kenya Polytechnic.

APPENDIX 2: TRADE TESTS COMPLETED DURING 1972, WITH SUB TOTALS FOR 19

	GRADE I		GRADE II		
	PASS	FAIL	PASS	FAIL	PASS
MECHANICAL ENGINEERING					
Blacksmith	1	2	1	5	2
Fitter (General)	9	5	48	35	102
Motor Vehicle Mechanic	63	45	146	194	352
Moulder	-	-	-	-	-
Panel Beater	5	2	4	2	14
Mainslayer	-	-	-	-	-
Pipe Fitter/Plumber	8	8	15	26	63
Plumber	-	-	-	-	-
Plant Mechanic	7	8	18	14	20
Sheet Metal	-	-	1	2	6
Spray Painter	1	2	2	1	10
Tinsmith	6	1	2	8	8
Turner	2	4	7	19	37
Auto Electrician	7	2	4	2	16
Welder (Arc & Gas)	14	17	18	36	82
Rural Water Supply (Artizan)	-	-	6	3	9
Sub-totals 1972	123	96	272	347	11
1971	147	161	294	336	819
1970	121	150	323	598	1,688

TRADE TESTS COMPLETED DURING 1972, WITH SUB TOTALS FOR 1970 AND 1971

GRADE I		GRADE II		GRADE III		TOTAL PASSES & FAILURES
PASS	FAIL	PASS	FAIL	PASS	FAIL	
1	2	1	5	2	4	15
9	5	48	35	102	108	307
63	45	146	194	352	327	1,127
-	-	-	-	-	-	-
5	2	4	2	14	4	31
-	-	-	-	-	-	-
8	8	15	26	63	89	209
-	-	-	-	-	-	-
7	8	18	14	20	26	93
-	-	1	2	6	9	18
1	2	2	1	10	4	20
6	1	2	8	8	22	47
2	4	7	19	37	53	112
7	2	4	2	16	7	38
14	17	18	36	82	79	246
-	-	6	3	9	1	19
123	96	272	347	711	733	2,282
147	161	294	336	819	778	2,535
121	150	323	598	1,688	1,793	4,673

APPENDIX 2 (cont'd)

TRADE DESCRIPTIONS		GRADE I		GRADE II		GRADE
		PASS	FAIL	PASS	FAIL	PASS
BUILDING						
Bricklayer		4	3	1	-	8
Mason (Building)		13	52	159	18	384
Painter		13	37	50	22	174
Signwriter		-	7	13	11	75
Sub-totals	1972	30	99	223	51	641
	1971	71	83	232	67	556
	1970	76	141	369	367	923
WOODWORK						
Carpenter		18	35	-	-	-
Carpenter/Joiner		-	-	79	145	241
Polisher		-	-	-	-	-
Wood Machinist		2	-	2	2	-
Sub-totals	1972	20	35	81	147	241
	1971	18	78	86	210	405
	1970	32	134	53	309	799
ELECTRICAL						
Wireman		15	32	57	71	207
Fitter (Electrical)		-	-	6	2	8
Linesman (Overhead)		-	1	11	1	37
Sub-totals	1972	15	33	74	74	222
	1971	15	13	38	44	125
	1970	75	64	74	105	239

GRADE I		GRADE II		GRADE III		TOTAL PASSES & FAILURES
PASS	FAIL	PASS	FAIL	PASS	FAIL	
4	3	1	-	8	5	21
13	52	159	18	384	32	658
13	37	50	22	174	108	404
-	7	13	11	75	1	107
30	99	223	51	641	146	1,190
71	83	232	67	556	46	1,055
76	141	369	367	923	481	2,357
18	35	-	-	-	-	53
-	-	79	145	241	297	762
-	-	-	-	-	-	-
2	-	2	2	-	-	6
20	35	81	147	241	297	821
18	78	86	210	405	275	1,072
32	134	53	309	799	1,505	2,832
15	32	57	71	207	207	589
-	-	6	2	8	-	16
-	1	11	1	37	10	60
15	33	74	74	227	217	665
15	13	38	44	125	98	333
75	64	74	105	239	344	901

APPENDIX 2 (Contd.)

TRADE DESCRIPTIONS		GRADE I		GRADE II		GRADE III	
		PASS	FAIL	PASS	FAIL	PASS	FA
TAILORING							
Tailor		5	5	13	15	103	
Dress-maker		3	9	25	19	93	1
Sub-totals:	1972	8	14	38	34	196	1
	1971	5	7	23	22	82	
	1970	7	7	1	4	22	
MISCELLANEOUS							
Shoemaker		2	6	5	7	16	
Upholsterer		3	-	3	4	13	
Sub-totals:	1972	5	6	8	11	29	
	1971	2	13	29	27	123	1
	1970	9	8	3	10	28	
GRAND TOTALS:	1972	201	283	696	664	2,070	1,6
	1971	258	355	702	706	2,110	1,3
	1970	320	504	823	1,393	3,699	4,2

SOURCE: Directorate of Industrial Training.

	GRADE I		GRADE II		GRADE III		TOTAL PASSES & FAILURES
	PASS	FAIL	PASS	FAIL	PASS	FAIL	
	5	5	13	15	103	53	194
	3	9	25	19	93	143	292
	8	14	38	34	196	196	486
	5	7	23	22	82	54	193
	7	7	1	4	22	54	95
	2	6	5	7	16	14	50
	3	-	3	4	13	7	30
	5	6	8	11	29	21	80
	2	13	29	27	123	148	342
	9	8	3	10	28	93	151
	201	283	696	664	2,070	1,610	5,524
	258	355	702	706	2,110	1,399	5,530
	320	504	823	1,393	3,699	4,270	11,009

: Directorate of Industrial Training.

APPENDIX 3:

INTAKE OF STUDENTS BY ENTRY REQUIREMENT & QUALIFICATION

Qualification aimed at:	Professional	Semi-Prof.	Skilled	Below Skil
Entry Requirement: Vocational Qualification Semi-prof. or above	50	230		
Vocational Qualification Skilled		85	130	
Vocational Qualification Below Skilled			195	200
Secondary School Form VI General		554	48	
Secondary School Form IV General	45	719	1950	
Tech/Voc.		824	108	
Secondary School Form III or below General			60	
Tech/Voc			135	
Primary School				777
No Formal Requirements		62	175	649
TOTAL	95	2474	2801	1566

APPENDIX 3:

TAKE OF STUDENTS BY ENTRY REQUIREMENT & QUALIFICATION AIMED AT, 1977

Professional	Semi-Prof.	Skilled	Below Skilled	Pre-Univ.	TOTAL
50	230				280
	85	130			215
		195	200		395
	554	48			602
45	719	1950		50	2764
	824	108			932
		60			60
		135			135
			717		717
	62	175	649		886
95	2474	2801	1566	50	6989

APPENDIX 4: OUTPUT BY INTENDED OCCUPATIONS, LEVEL & SECTOR (1971)

	TECHNICAL	AGRICULTURE	BUSINESS	OTHER	TOTAL
PROFESSIONAL					
Electrical & Electronic Engineers	25	-	-	-	25
Mechanical Engineers	15	-	-	-	15
Jurists	-	-	45	-	45
TOTAL	40	-	45	-	85
SEMI-PROFESSIONAL					
Physical Science Technicians	73	-	-	-	73
Draughtsmen	7	-	-	-	7
Engineering Technicians (Construction)	273	-	-	-	273
Engineering Technicians (Mechanical & Motor Vehicles)	268	-	-	-	268
Engineering Technicians (Aeronautical)	25	-	-	-	25
Enginnering Technicians (Water)	74	-	-	-	74
Engineering Technicians (Electrical)	233	-	-	-	233
Engineering Technicians (Other)	24	23	-	-	47
Agronomists	50	35	-	-	85
Agricultural Instructors & Extension Workers	-	268	-	-	268
Qualified Workers n.e.c. Farming, etc.	-	153	-	-	153
Veterinary Assistants	-	99	-	-	99
Medical/Dental/Veterinary n.e.c.	-	-	-	20	20
Semi-professional Accountants	-	-	253	-	253
Secondary Teachers, Science	-	-	-	45	45
Secondary Teachers, Technical	-	-	-	120	120
Government Administrators (S/P)	-	-	70	-	70
General Managers (S/P)	-	-	170	-	170
Production Managers (S/P)	14	-	-	-	14
Farm Managers (S/P)	-	15	-	-	15
Managers n.e.c. & W.Ps (S/P)	-	-	-	55	55
Other Professionals, S/P, n.e.c.	10	-	90	12	112
TOTAL	1,051	593	583	252	2,479
SKILLED AND BELOW					
Clerical Etc., Administrative, Supervisors	6	-	48	-	54
Short Hand Typists etc.	-	-	1,617	-	1,617
Lower Accountants, Bookeepers, Cashiers	-	-	387	-	387
Other Clerical n.e.c.	15	-	153	-	168

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APPENDIX 4 (Contd.)

	TECHNICAL	AGRICULTURE	BUSINESS	OTHER	TOTAL
Specialised Sales, Service Workers	-	-	-	60	60
Production Supervisors, General Foreman	31	314	40	-	385
Tailors & Dressmakers	635	-	-	-	635
Patternmakers, Sewers, Upholsters	50	-	-	-	50
Fitter-Machinists, Toolmakers	18	-	-	-	18
Non-Agricultural Machine Fitters/Assemblers	40	-	-	-	40
Motor Vehicle Mechanics	95	-	-	-	95
Agricultural Machine Fitters/ Assemblers	-	18	-	-	18
Non-Agricultural Mechanics/ Repairmen	106	-	-	-	106
Electricians General	50	-	-	-	50
Plumbers & Pipe Fitters	70	-	-	-	70
Welders & Flame Cutters	23	-	-	-	23
Sheet & Structure Metal Workers	35	-	-	-	35
Compositors & Typesetters	16	-	-	-	16
Pressmen	4	-	-	-	4
Other Printers etc.	30	-	-	-	30
Painters	30	-	-	-	30
Stonemasons/Bricklayers	136	-	-	-	136
Carpenters/Joiners	139	-	-	-	139
Other Construction Workers	20	-	-	-	20
Other Skilled n.e.c.	19	-	-	-	19
TOTAL	1,568	332	2,245	60	4,205
FURTHER TRAINING					
Professional	45	-	-	-	45
Skilled	90	-	-	-	90
TOTAL	135	-	-	-	135
GRAND TOTAL	2,794	925	2,873	312	6,904